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The Effect of Urban Design on the Community and Society in Hong Kong's New Towns: A Study of Sha Tin and Tin Shui Wai

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ABSTRACT

This project, sponsored by the Chinese University of Hong Kong examined the effect of urban design on the community and society in Hong Kong's new towns, looking specifically at the new towns of Sha Tin and Tin Shui Wai. Sha Tin is considered by the government and residents alike to be a good example of a successful new town while Tin Shui Wai has been dubbed by some as the "City of Sorrow." The project looks at each town with respect to the aspects of urban design that have the greatest effect on community development, including street layout and vibrancy, building types and layouts and, the demographic diversity. It concludes that Tin Shui Wai's large, monotonous streets, little diversity in building types, poor economy and severe lack of vibrant walking paths all limit the opportunities of residents to build social bonds and that future new towns should be void of these problems in order to develop a strong, social community.

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AUTHORSHIP

Brian Eccles' Contributions

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EXECUTIVE SUMMARY

Over the course of the past half century, a number of self-contained new towns have been built in Hong Kong with the purpose of dealing with the region's explosive population growth. While these towns have successfully alleviated the stress on Hong Kong's urban areas, a number of unforeseen problems have arisen resulting in some towns developing into dull and lifeless areas. This project, sponsored by the Chinese University of Hong Kong, aimed to compare the effects of urban designs on the local communities between the two new towns of Sha Tin and Tin Shui Wai, and use this information to compile a list of recommendations for the construction of future new towns so they don't suffer from the same problems as their predecessors.

The project investigated a number of elements within the concept of urban design and applied them to Sha Tin and Tin Shui Wai and determined the effects they have on the towns' community and society. The first of these elements is street layout and walkability. Well designed streets promote pedestrian traffic by providing residents with both easy accessibility to key locations and well laid out paths that are pleasant and safe to traverse. This in turn enhances the local community by allowing residents to interact more fully with all of the city's attractions and services and with each other. The second element examined is the design of public spaces. Public spaces are crucial additions to any city that provide distinct landmarks and create contrast from the monotony of glass and concrete buildings. Well-designed spaces provide residents with an oasis from busy urban life, and also foster social interchange and community growth. Many cities are even designed around large public spaces which become central areas for community life. Finally, commercial and retail areas were investigated. These facilities provide residents not only with shopping but also with employment opportunities and areas for chance encounters and exchange of information. Well-designed retail areas not only improve

quality of life by offering citizens greater freedom of choice but they also can enhance the local economy and encourage community growth.

In addition to research on these urban layout topics, this project also investigated the planning and development of each town to further understand the factors that affected their growth. Important policies such as the Housing Policies that came into effect in the early 1970's were examined to determine their effects on the housing balance of each town and the resulting consequences on the community and economy diversity of both towns. Public Transportation links to both areas were also studied. Since the migration of secondary industries to Mainland China, the economic focus of Hong Kong has shifted resulting in more attention being placed on the transportation links to New Towns rather than on economic self-sufficiency. Currently the majority of Hong Kong citizens commute to work every day using public transportation, and therefore well linked areas attract significant private sector interest, in turn boosting the local economy and making the area more attractive to middle and upper class citizens.

A large part of the project involved data collected on-site through mapping and observations. A number of maps were created detailing locations and uses of buildings in both towns so that both towns' designs could be compared and analyzed side by side. In addition to building analysis, maps were also made comparing the street layouts of both towns. These maps allowed the team to pinpoint the key differences between the layouts of both towns and recognize the implications of these designs on the social integration of each community. The team also conducted a number of field studies during which detailed observations were made while walking predefined routes. Through these observations the team was able to make a number of conclusions regarding the benefits and drawbacks of the urban design of each area

Two interviews were conducted to gain additional background information relevant to the two new towns. The first interviewee was with Professor Mee Kam Ng, the director of the Urban Studies program at the Chinese University of Hong Kong. During the course of the interview, a number of questions were asked regarding the effects of planning decisions on both towns, general questions about Hong Kong's society and communities, and how income diversity can affect the sense of community in a town. The second interview was conducted with Professor Hendrik Tieben, a professor from CUHK's School of Architecture and an expert on urban planning. Professor Tieben was asked similar questions on the history and urban design of the two new towns, as well as his opinion on the main causes for Tin Shui Wai's lack of success. Professor Tieben was also asked general questions about Hong Kong's society and how he thought urban design could be used to foster community growth in new towns.

Finally, in order to better understand the circumstances surrounding the residents of each town, the local income diversity and demographics were researched using the website Centamap which collects and organizes census data from the Hong Kong government. A number of previous surveys, group studies, and interviews of local residents in Tin Shui Wai were also examined. Through this research, a number of supporting statistics were compiled that can be viewed in the appendix of the report.

Following data collection, a number of conclusions were drawn from the analysis and comparison of the results. The Centamap data showed that Sha Tin's average incomes and demographics were closer to the averages throughout Hong Kong, while Tin Shui Wai's often indicated various problems. The statistics also showed a significant gap between the income levels of private and public housing, and an imbalanced amount of public housing in Tin Shui Wai.

Through the map comparisons, the team found that Tin Shui Wai's modular design created much more inwards-looking neighborhoods that resulted in self-contained and isolated areas. The large number of main roads also created barriers that limited the walkability of the town and separated neighborhoods from each other. Combined with the Light Rail System, which ran on fenced-off rail lines, the overall street layout of Tin Shui Wai caused fragmentation of the local area and discouraged social interchange. On the other hand, Sha Tin's designs had much more distinct public spaces, commercial facilities, and residential areas that created well-defined distinct areas that allowed residents to interact more fully with the city. Sha Tin's network of streets also contained a more balanced mix between arterial and local roads, which made it more convenient and pleasurable to traverse and promoted pedestrian traffic. A number of conclusions were also drawn from the observations taken while walking the preplanned routes. The team found that the pedestrian walkways in Tin Shui Wai were far more sectioned off than those in Sha Tin. The majority of these walkways ran alongside large arterial roads, and contained barriers and a large number of traffic lights. Most private and even some public housing complexes were gated off preventing the non-resident from walking through and further fragmenting the town. Tin Shui Wai had a complete lack of small shops and marketplaces, often resulting in dull paths that do not promote interaction with the city. The roads in Sha Tin, on the other hand, seemed to be more effective as they contained far less obstacles, and the roads they ran alongside were typically smaller and more easily crossable. Pedestrian walkways in Sha Tin were also bordered by marketplaces or small shops in many locations, making walks more interesting and attractive. Key observations were also made of open spaces in both towns. The river in Sha Tin forms the centerpiece of the town and creates a large open-air area that makes the town less claustrophobic and allows pedestrians to get a better sense of direction. Public

spaces and vegetation were also well embedded into the city, and promoted social activities. Tin Shui Wai, on the other hand, seems much more enclosed as the density of high-rises tends to create a prison of buildings that form a dull and repetitive landscape. Many parks and public spaces in Tin Shui Wai, while quite attractive, seemed sectioned off and were not very inviting to residents. Instead they seemed to mostly be aesthetic displays, rather than inviting areas for community development.

Based on research, data collection, and analysis, a number of recommendations were compiled for consideration during the development of future new towns. The recommendations suggest that parks should not simply be used as walkways, but should be designed in a way that promotes interaction between residents. Likewise, a range of retail facilities should be available to not only cater to the needs of residents of all income levels, but also to promote social exchange and create hubs of community activity. Key facilities such as the MTR station in Tin Shui Wai should be placed in a more central location to improve pedestrian accessibility to all parts of the town. Street designs should contain a balance between arterial and local streets to accommodate for both foot and automobile traffic so that areas do not become heavily fragmented. Lastly, the natural environment and culture should be taken into account during urban planning so that distinct aesthetic properties and community icons can be preserved.

1 INTRODUCTION

Hong Kong is a small region in southeastern China that was under British colonial rule from 1842 until 1997 when it became a Special Administrative Region of the People's Republic of China, with a brief period of Japanese occupation during World War II. After the end of World War II, due to political unrest in Mainland China, Hong Kong received an influx of immigrants, causing immense population growth (Carroll, 2007). The population of Hong Kong began to grow rapidly, increasing from just half a million in 1945 to well over six million by the turn of the century. Such rapid urbanization introduced a number of new problems to Hong Kong, a tiny island region. Living conditions worsened as space grew thin, and densely packed areas turned into slums riddled with poverty. Different cities across the world had implemented various solutions to address housing limitations like these, with suburbs being a popular resolution in many countries. However, the expansion required to construct suburbs is only possible in cities surrounded by large amounts of buildable land. Hong Kong, a small region, whose limited land is further reduced by large sections of steep mountain terrain, did not have this option of expansion and chose instead to construct new towns. These new towns are preplanned and self-sufficient towns that provide residents not only with housing but also with employment, commercial and recreational facilities, and transportation links to the urban centers.

Since their construction in the mid to late 1900's, the new towns of Hong Kong have matured greatly and in the past few decades, reached or even surpassed their original planned capacities. On the surface, these towns seem to have achieved their intended purpose of relieving the stress of Hong Kong's urban areas; they now contain almost half of Hong Kong's population. Complete with facilities to maintain self-sufficiency and linked together by a comprehensive rail system, these towns seem like ideal places to live. However, despite their successes from a

functional and practical standpoint, many of these cities have ended up developing into dull, lifeless areas lacking the vital social and community elements that make up the heart of a city. The rapid development of many of the later new towns, driven by the demanding new housing policies of the 1970's, sometimes forced planners to compromise to meet the high quotas for construction each year, leading them to overlook the impact of their designs on social and community aspects of towns. This project investigated Tin Shui Wai, a highly populated city of almost 300,000 which has attained the nickname of the “City of Sorrow,”and compared it to Sha Tin, a town on the other side of the spectrum commonly considered a very successful new town, with respect to the impact their urban design has on social and community quality of life. The study was carried out through both a mapping of multiple aspects of Sha Tin and Tin Shui Wai as well as observations made while traveling through them. This project intended to draw attention to flaws in urban designs and layouts of new towns that may seem sound from a practical standpoint but are in fact greatly detrimental to the community and livability of a city. Using the conclusions drawn from these comparisons, a list of suggestions has been compiled for the betterment of the design of future new towns.

2 BACKGROUND

2.1 Introduction

This chapter will establish a background on the topic of urban design and its application to Hong Kong and its new town in order to provide a basis for our investigation and methods. Much of the information in this chapter will also be used in developing our conclusions and recommendations for future towns. It will begin by introducing the theory of urban design and its components, including street and block layouts, public space design, architectural attractiveness and walkability. It will then explain the urban design guidelines in Hong Kong and provide an introduction to the concept of new towns and how Hong Kong used them to house a rapidly growing population. Furthermore, the planning history of both towns being studied, Sha Tin and Tin Shui Wai, will be discussed as well as some important aspects of their design and population.

2.2 Theory of Urban Design

Urban design can be defined as the art of designing places for people by setting a framework of the physical and spatial arrangements of built forms. The goal of urban design is to create built forms that relate to the space around them to achieve overall aesthetic and socio-cultural quality. This section attempts to provide an introduction to urban design and give background to the qualitative topics of public space design, walkability, street and block layout, and diversity of building types.

2.2.1 Streets and Walkability

Streets are an integral part of a city's layout and urban design. Anne Moudon describes streets as being more than just traffic channels; she states that "streets and their layout reflect the societies that create them, they irrigate the city with people and they link urban activities in time

and space. Streets connect places in a city together, providing corridors for people to walk, bike, drive, shop, eat and socialize. They are more than just channels for vehicular and pedestrian traffic; they are an important tool for urban designers to develop vibrant, livable and, most importantly, walkable cities" (Moudon, 1991). Walkability, as it pertains to urban design and street layout, can be defined as "the extent to which the built environment supports and encourages walking by providing for pedestrian comfort, safety, connecting people with varied destinations within the reasonable amount of time and effort, and offering visual interest in journeys through the network." (Southworth, 2005; Leung, 2012). Walkability is a blanket term that encapsulates almost everything pertaining to urban design, and street and block layout. To encourage residents to walk to their destinations, the walk must be useful, safe, comfortable and interesting.

Walking must be useful to the individual, meaning that "most aspects of daily life are located close at hand and organized in a way that walking serves them well" (Speck 2012). Usefulness is directly correlated to street and block layout where the proper balance of necessary activities must be placed within walking distance of each other. Smaller street and block lengths create more side streets providing multiple pathways and shorter distances to walk to various locations. This small block layout allows the buildings to be closer together, creating a continuous array of shopfronts with something to offer the pedestrian.

Safety is another concern for urban planners as residents who don't feel safe walking around a city will choose other modes of transportation. Vehicular traffic greatly affects pedestrian movement, walkability and the social interactions of residents. Traffic engineering is often at odds with good urban design as vehicles tend to make city streets hostile to pedestrians while urban designers struggle to make it more friendly. As one author describes it "the right to

access every building by personal car is the right to destroy the city" (Bain, 2012). Streets need to accommodate all modes of transportation including cars, busses, bikes and pedestrians. Streets are public spaces and need to cater to diversity as such (Bain, 2012).

Speeding vehicular traffic is detrimental to pedestrian safety. It is well known that smaller block sizes increase pedestrian safety. Small block sizes are prevalent in most European cities making them very walkable. Having larger blocks creates larger streets where drivers are more inclined to speed up because they have more space to maneuver. A University of Connecticut study showed that block size was the number one variable related to injury and death on city streets and that doubling block size triples fatalities (Speck, 2012). Due to this ratio, street design becomes a counterintuitive process because planners must balance the elegance of simplicity with more complicated and confined street layouts that are safer for pedestrians. Even taking down signage contributes to increased safety because a driver who is more cautious of their surroundings is less likely to take large risks that may result in an accident. Replacing traffic lights with stop signs and taking away push button cross walks out of the roadways will require drivers, pedestrians, and cyclists to think at every intersection, creating a safer environment (Speck, 2012). In terms of sidewalks, there must be curbside protection, preferably in the form of parked cars. Also in the event that a walkway is required along a road with very high speed limits, other options like suspended walkways, and foot bridges should be considered over sidewalks.

A walk also needs to be comfortable. This begins with the overall enclosure of spaces. "Enclosure is the degree to which public spaces are defined by the buildings, walls trees and other vertical elements" (Ewing, 2009). Humans psychologically need to see and feel the well defined edges around them to feel comfortable, especially in an outdoor space (Speck, 2012).

When the height of the surrounding elements is proportional to the width of the street, a room-like quality is created enclosing the individual in the space. These boundaries allow the pedestrian to walk comfortably in what can be viewed as an "outdoor living room."

Lastly, the vibrancy, or visual attractiveness, of the surrounding area can greatly affect a person's decision to walk. Bland, unappealing structures surrounding walking areas can turn away pedestrians, especially if driving is faster. Pathways and downtown areas need to be distinct and should contain recognizable landmarks and features. On an interesting walk there must also be a degree of transparency, so the pedestrian can see all that is going on in the distance and inside different buildings. Complexity of urban form also makes a walk interesting, allowing the walker to experience a variety of different building types, landscape elements, signage and human activity (Ewing 2012). This ties in to the uses of buildings; mixed use buildings provide more complexity and more activity than bland single use residential buildings or commercial complexes. Paying attention to these factors will strengthen the town's walkability and increase the number of residents that choose to walk.

2.2.2 Public Space Design

The quality of public spaces is one of the most important aspects of the urban design of towns. New towns tend to be centered and developed around these spaces. Well-designed public spaces should be located at a reasonable distance from all residents depending on the structure of the town. In most cases this location is central, making spaces easily accessible from all directions. Since public spaces become mirrors of their surroundings, it is important for the space to be located in an area that makes sense for the entire community. After a location is set, spaces should be designed with a strong sense of flow to alleviate any traffic that might develop.

These areas not only need to accommodate average pedestrians using them as a means of travel, but also need to incorporate spaces that provide opportunities for recreation and leisure. They should be suitable for various activities so that they will attract the diversity of the community without alienating any particular groups of people. As proposed by Jan Gehl, the people who visit a public area for the purpose of activity and recreation are the ones to consider the most when designing a public space. The reason for this is that these are the people who bring liveliness to the public space and make it a more enjoyable place to visit and walk through. In his report, *Public Space and Public Life*, Gehl states "A public space of high quality will always be recognized by people interrupting their walk or daily business so they can rest, enjoy the city, the public spaces and be together with other people" (Gehl 2002). The area is no longer public if only a few demographics use the space, and so it is important that it is attractive and welcoming to people of varying backgrounds and interests. Public spaces are also the setting of the chance encounters that happen on a daily basis. These encounters breed familiarity within a town and in turn make the town feel safe and livable.

2.2.3 Commercial Facilities and Shopping

Urban shopping is not just an everyday task but a social ritual that can have significant impacts on the local community. Aside from the simple task of purchasing goods, shopping can also include window shopping, promenading, meeting friends informally, and spontaneous exchanges. In a city where commerce has weak links to the community, shopping becomes a strictly functional act of purchasing that only involves a simple trip to a shopping center or supermarket. Shoppers become isolated from the community around them, which in turn greatly reduces the vibrancy of shopping areas. On the other hand, well laid out designs that promote

communication and spontaneous exchanges can create vibrant marketplaces and city centers that form a hub of exchange for residents to enjoy.

2.2.4 Sense of Community

Historically, cities were founded and developed around a central community. They brought together people from all sorts of backgrounds and cultures, and provided a place for them to live, work, shop, and play. Cities have been the driving force behind innovation, social improvement, cultural activity, and diversity. They are areas with a high level of culture and have even been described by some as the most advanced work of art by the human civilization (Giddings, 2007). In recent years however, there has been a deterioration in the community within cities, especially evident within some of the new towns of Hong Kong. The combined results of economic pressure and government planning have resulted in the construction of pre-planned urban areas that may have the concentration of population but lack the essence and character of a city (Lozano, 1990).

The essence of cities is close connections and dense activity. In order to create a strong sense of community in an area, it is important for the urban design to encourage interaction between residents and their surroundings. Everyday tasks and travel should provide the opportunity for chance meetings, exchanges, and spontaneous enjoyment of city spaces. Obstacles such as major road networks can fragment neighborhoods, destroying local social interchange and discouraging pedestrian activity. Poorly planned zoning can create subdivided areas that result in monotonous environments and isolation of residents. The overuse of single-use buildings is another common issue brought about by modernization. Buildings like these create monotonous, repetitive environments of steel and concrete to which residents have no

sense of attachment, and take away from the rich patterns and symbols that make each city distinct (Lozano 1990).

In order to promote a strong sense of community and create a city that residents can truly appreciate, the urban design of a city should support the local people, businesses, and activities. Structures and open spaces should enhance the quality of the environment, encourage walking, support public spaces and buildings, and be designed to be usable by the people. While some of these changes may not be appealing to property developers or investors, it is an important factor for the proper development of a community and in creating a sustainable city.

The overall identity of neighborhoods is dependent on many different factors including the values of the individuals, social norms, and length of residence. General, unplanned social interactions cultivate this sense of neighborliness so there is no correct way of measuring it or creating neighborliness within a community besides having interactions develop naturally. As there is more neighborliness in a community there is also a better sense of belonging and ownership (Dhar 2007). Chance social interaction can be intensified through the town layout. The proper layout creates more frequent and convenient chance encounters.

2.3 Urban Design in Hong Kong

Hong Kong has its own Urban Design Guidelines created by the Planning Department to provide a functional framework to assess urban design. The guidelines provide extensive design considerations for Hong Kong's restrictive topography of mountains and coastlines. New towns are also considered in these guidelines.

According to the guidelines, the natural environment informs the design of every new town. All natural features are to be maintained and visually unobstructed. The new towns accomplish this through the stepping of building heights downward as the town moves closer to

the rural fringes of the environment. The stepping of building heights is accomplished through diversity of building types with low rise schools, and community centers being gradually stepped to high rise housing developments. New towns are also meant to have no developments that are out of place of their surroundings.

The waterfront is intended to be an activity hub and the aesthetical centerpiece of the town. Landmarks that accent points of water travel, such as a harbor entrance, are encouraged. Buildings on the waterfront should keep a shorter profile to sustain visibility of the harbor. If proper sight lines are present then natural pedestrian accessibility to the waterfront will also exist.

2.4 Hong Kong's New Towns

The New Towns of Hong Kong were planned and developed carefully with the objective of being largely self-reliant. Therefore, in addition to residential areas, these towns also contain commercial, industrial, and recreational areas. Most of the new towns were developed around a town center, which is the business, cultural, and traffic hub of the town. These central areas typically contain public spaces such as shopping malls, libraries, theaters, government buildings, and transportation terminals.

A new town is essentially a planned urban area that can be used for various land activities, such as residential living, recreation, and education. It is "a planned community consciously created in response to clearly stated objectives" (Chan, 2001). Hong Kong adopted the new town system from London, but customized the model to accommodate the working class by providing local employment opportunities (Chui 2008). The Hong Kong new town policy reached the height of its implementation in the 1970s, after in 1972 the governor of Hong Kong, Murray MacLehose, declared a plan for a ten year program that aimed to house approximately

1.8 million people in new towns. This plan required the new towns to be built in the empty expanse of the New Territories which was originally sparsely populated farmland. The development of the new towns drove thousands of people to migrate to the area causing rapid growth. The new towns of Hong Kong are noteworthy because many of the towns were constructed in only 10 years' time, much faster than other new towns that had been developed around the world (Ho, 1992). The original aims of Hong Kong's new towns were several fold: to provide adequate housing at a reasonable price, promote the demand for home purchases, ensure that the need for all types of housing is satisfied, and improve the residential living conditions by remodeling old housing estates (Dhar 2007). The new towns also were made to be self-sufficient urban centers with their own local atmosphere separate from Hong Kong's main urban center (Ho, 1992).

The creation of the new towns has significantly increased the population mobility of Hong Kong as a whole. The mobility index, a statistic of the number of households that have moved from one district to another, shows that 45% of Hong Kong citizens are currently living in one of the nine new towns. The top five districts on this index are all new towns including, North Lantau, Tai Po, Tin Shui Wai, Tuen Mun, and Sai Kung (Hui, 2005).

2.4.1 Housing Policies

Housing shortage had been a longstanding issue in Hong Kong, bringing about the development of the first new towns in the early 1960's. During this time, the new town program in Hong Kong was formed and consolidated, but did not truly gain momentum until the first long term housing plan was instantiated in 1972. Sir Murray MacLehose, the governor of Hong Kong at the time, considered the lack of housing to be the greatest deficiency of Hong Kong and created the Ten Year Housing Program with the goal of creating 1.8 million residential flats

within a 10 year period (Hills 1983). To meet this new goal, the government increased the production target from 20,000 flats in 1978-1979 to 45,000 units in 1979-1980. However, in the next year, the target was adjusted to a more realistic value of 35,000 units a year after reevaluating the strain that the target placed on the industry (Law et al. 2009). In 1982, the Ten-year Housing Programme was extended for another five years to 1987. In subsequent years, another long term housing strategy covering the period from 1987 to 2001 was announced, which set a target goal of 40,000 public housing units and 30,000 private units annually.

These housing policies were instantiated half-way through the development of Tin Shui Wai right after the completion of Tin Shui Wai South and were in effect for the entirety of the development of the Northern reserve zone. A large 70 hectare plot of land was set apart in Tin Shui Wai for this fast paced development, and as a direct a result many alterations were made to the original development plan of Tin Shui Wai in order to keep up with the demanding pace. Three areas in Tin Shui Wai South originally planned for industrial sites were allocated to the Housing Department, and at the turn of the century some 13,000 sale flats in Tin Shui Wai were transferred to rental use. In addition, production and sale of subsidized sale flats were ceased indefinitely from 2003 onwards (Law et al. 2009). These changes had a huge effect on the final state of Tin Shui Wai and the eventual community mix in the area. The targeted and actual production of housing from 1992 to 2008 in Tin Shui Wai and Hong Kong as a whole can be seen in Table 1.

Table 1
Targeted and Actual Housing Production in Tin Shui Wai and Hong Kong as a Whole from 1991 to 2008 (Law et al, 2009)

	Overall Hong Kong				Tin Shui Wai District			
	production target[47]	actual production			actual production			
		rental housing flat	subsidized sales flat	total	rental housing flat	subsidized sales flat	total	% in overall production
1991/92	48231	21190	13698	34888	3308	0	3308	9.5
1992/93	41000	22576	15322	37898	9833	1824	11657	30.8
1993/94	42000	19848	24743	44591	3179	1216	4395	9.9
1994/95	42000	24440	4004	28444	0	0	0	0.0
1995/96	48000	14559	19328	33887	0	0	0	0.0
1996/97	56800	14946	16878	31824	904	0	904	2.8
1997/98	50000	18061	12040	30101	2494	756	3250	10.8
1998/99	32000	10331	18168	28499	0	0	0	0.0
1999/00	58000	27785	20699	48484	3719	10740	14459	29.8
2000/01	90000	55492	33510	89002	5987	4480	10467	11.8
2001/02	40000	29817	9588	39405	9889	1600	11489	29.2
2002/03	36100	20390	0	20390	5698	0	5698	27.9
2003/04	23800	15148	320	15468	0	320	320	2.1
2004/05	21000	24682	0	24682	5640	0	5640	22.9
2005/06	20000	17153	0	17153	0	0	0	0.0
2006/07	7200	7192	1200	8392	0	0	0	0.0
2007/08	16400	13726	1386	15112	3836	0	3836	25.4

On the other hand, the new housing policies had a mostly positive effect on Sha Tin by providing the main stimulus for its development. The development of Sha Tin has been very fast, with its population growing from twenty thousand to two hundred thousand in ten short years. Closely following the original development plans, Sha Tin developed as a balanced town with a good mix between public and private housing. Sha Tin is also well provided with open space and recreational facilities, and also contains additional facilities such as the racecourse and the Olympic Jubilee Sports Center (Hills 1983).

2.4.2 Public Transportation

Prior to the development of New Towns, most areas in the New Territories were poorly connected. In order to accommodate the newly generated traffic between the New Towns and central urban areas, a network of new roads and highways was constructed, along with new tunnels and bridges to shorten commute times. There are approximately 1,181.86 km of road

connecting the New Territories, which is more than any other region in Hong Kong (Annual Traffic Census).

Public transportation within a city is a by-product of whether a city evolved around the car or not (Speck, 2012). Hong Kong is the global leader in the number of people who use public transportation at 73% of its population (Speck 2012). Unfortunately some new towns are still not self-sufficient making commuting from the town to urban centers a necessity for people who work out of town. The more "mature" new towns such as Sha Tin and Tsuen Wan are noticeably more self-sufficient with less cross district commuting, while emerging new towns like Tin Shui Wai don't have all the proper necessities within the town. Sha Tin had the advantage of being developed along the main rail connection between Hong Kong and Guangzhou via the MTR East Rail line (previously Kowloon Canton Railway), and therefore has easy accessibility to urban centers such as Kowloon and Hong Kong Island. Tin Shui Wai, on the other hand, was not connected via rail until the construction of the West Rail Line until 2003. Before 2003, commuters in Tin Shui Wai had to take long and expensive bus rides into the urban areas. Tin Shui Wai is also serviced by 16 light rail stations connecting it to the light rail system in the Northwester New Territories.

2.4.3 Development of Sha Tin

Development in the area of Sha Tin began in 1961 with formal development plans implemented in 1972 and expanded upon in 1979. The town was divided into small sections and developed using a multi-phase 'development package' approach. Sha Tin was divided into 24 of these 'packages', which were then constructed in order of priority in relation to financial considerations and maintaining the balance requirement. The area within each package is designed to be as self-sufficient as possible, containing all essential services, community

facilities, and communications. Residential and commercial areas were located within separate packages that were developed simultaneously in order to maintain overall balance (Hills 1983).

Although Sha Tin is largely self-contained with regards to the provisions of educational, health, community, and recreational facilities, it initially had difficulties creating enough employment opportunities for the local residents. Like most early new towns, Sha Tin was developed together with an industrial core meant to provide manufacturing jobs to the residents. However, as secondary industries began to shift from Hong Kong to Mainland China during China's industrial boom in the 1980's, Sha Tin encountered the problem of finding companies to fill the vacant industrial spaces within the industrial centers. In 1981, Sha Tin contained a population of 210,000, which, based on planning standards, required a corresponding 40,000 manufacturing jobs to maintain self-sufficiency. Yet at the time, only a meager 8,000 jobs were available. This employment problem was largely caused by the difficulty of transitioning new and existing businesses into the new area. In addition, a survey at the time found that less than 50% of those currently employed in Sha Tin were actually local residents, meaning that many firms and companies moved into Sha Tin with their own workforces. This issue was in part due to the difficulty that companies faced with recruiting local workers. A deficiency of public transportation links within the city made it difficult to travel between the residential and commercial areas. In many cases it was actually more convenient for residents to commute to Kowloon rather than travel between Sha Tin's own residential and commercial sectors (Hills & Yeh 1983). Many of the newer residents also tended to keep their previous jobs in the urban areas to retain their seniority and accumulated benefits.

These early problems were largely overcome as Hong Kong restructured its economy away from manufacturing towards finance and business support. As a result the development of

Sha Tin shifted from balancing housing with employment to improving the regional transit system and transport links to Hong Kong, Kowloon, and the surrounding urban areas (Richardson). With the completion of major projects such as the second Lion Rock Tunnel, double-tracking and electrification of the Kowloon-Canton railway and East rail, Sha Tin's accessibility has improved significantly. Most urban areas of Kowloon and Hong Kong Island can be reached within 30 minutes using the MTR. These excellent transportation links with urban areas along with cheaper property have attracted many private sector developers and a large number of middle-income families (Hill & Yeh 1983). The local economy of Sha Tin has grown and developed steadily into the 21st century. Today Sha Tin supports a population of about 630,000 with about 60% of the employed residents commuting daily to urban areas for work (CEDD 2013).

2.4.4 Development of Tin Shui Wai

Tin Shui Wai, the eighth new town built out of nine, was developed on a 430 hectare plot of land located in the northwestern part of the New Territories close to the Chinese boundary. The land in this area is relatively flat, and was originally used for fish and duck farming within the boundary of the Yuen Long District. Plans to develop Tin Shui Wai started in the late 70's and early 80's. Initially, Mightycity Company Limited (MCL), a private developer, had acquired almost all of the land in Tin Shui Wai in the late 70s, and wanted to develop a large town for a population of 535,000. MCL proposed a joint venture with the government in which MCL would provide land for public housing to accommodate 250,000 people in exchange for the government's provision of infrastructure. This idea was proposed to the government in January of 1980, but was declined in 1982 as the scale was considered too large. Instead, an agreement was reached in which the government would buy all of the land for a sum of nearly HK$1.5

billion, which would then be invested by MCL back into the site. The agreement stated that about 169 hectares of land in the southern part of Tin Shui Wai would be a development zone for a population of about 135,000, and the remaining land would be kept as a reserve zone. Within the development zone, 38.8 hectares of land would be given to MCL for development into private housing and commercial facilities (Law, Wong, Chui, Lee, Pong, Yu, Lee, 2009).

Official approval for Tin Shui Wai to be developed into a new town was given in the early 1980s, and a Master Development Plan was formed in October of 1983 by Shankland Cox Partnership and Binnie & Partners. According to this MDP, Tin Shui Wai was designed to be a self-contained and balanced community, with roughly half of the housing being public rental flats and half being public sale flats or private housing. The town was also meant to be self-contained with industry, community facilities, commercial centers, and open space for leisure activities. Population intake was expected to start by 1988, but due to delays in the land clearance and formation of the site, the first private estate of Kingswood villas was not completed until the end of 1991, and Tin Yiu Estate, the first public housing site, was not ready until 1992. By the late 1990s the development zone, commonly referred to as Tin Shui Wai South, was almost fully developed, and in 2000 already had a population of 187,000. The planning process for the reserve zone, or Tin Shui Wai North, began in 1995 and site formation started in June of 1997 (Law et al. 2009). Due to the aggressive housing policies in effect during this time, Tin Shui Wai was marked for fast-paced development in order to meet the booming housing demand. As a direct result a number of changes were made to the original development plan: commercial areas originally set aside for industry were repurposed for residential housing and sale flats were transferred to rental uses. Population intake started in 2000 and in five short years the population in Tin Shui Wai North had already reached around 100,000 of the targeted

120,000 residents. During the development period between 1991 and 2008, Tin Shui Wai contained 13.8% of the total housing population and at the peak of its development in 1992 it accounted for over 30% of the yearly housing production. This extremely rapid development caused a large inflow of people and completely changed the community mix in Tin Shui Wai, resulting in a much larger number of residents from low income groups. The expanded town currently has a population of about 292,000 people, 95% of its 306,000 resident capacity (CEDD), making it the most densely populated new town with a population density of 62,579 persons per square kilometer, twice that of the second densest town (Law et al. 2009).

2.4.5 Commercial Facilities in Tin Shui Wai

According to the original MDP, the total commercial floor space in the development zone was planned to be 90,000 square meters, of which 75,000 square meters would be developed by MCL. This number was later revised to 135,000 square meters as the result of a lease modification. Because of the modular development of Tin Shui Wai, most housing estates contain their own shopping facilities within the block. These commercial facilities are planned for local needs only, containing stores that primarily cater for the resident's daily necessities, while Yuen Long was expected to have the role of the major commercial and retail center in the district. In the 1988 Development Program, a market was planned in the area which is currently occupied by the bus terminal and the Central Park Towers, to be completed in 1995. However, this proposal was objected to by MCL on the grounds that it might compete with the commercial facility within their private development, and the plans for the market were abandoned.

In November of 2005, eight of the retail facilities in the public housing estates were divested to the Link Real Estate Investment Trust, leaving only the shopping centers in Tin Ching and Tin Yan estate under the Housing Authority. Link has control over almost all the

commercial activities in the area, with them controlling over 60,000 square meters of floor area whereas the Housing Authority controls only 5,000.

According to the results of the street survey, most residents of Tin Shui Wai purchased their food, daily consumables, and leisure items within Tin Shui Wai. Residents who traveled outside of the new town to shop did so because there was more variety outside, or because it was cheaper. Table 2 illustrates the percentages of residents who shopped within or outside of Tin Shui Wai and the top two reasons for their decisions based on the street surveys.

Table 2
Percent of Residents Who Shopped for Specific Items Inside and Outside Tin Shui Wai

	% did not shop for this kind of item	% did most shopping within TSW	Top 2 reasons for not shopping within TSW
Food	0%	84%	Cheaper, More choices
Daily Consumables	1%	89%	Cheaper, More choices
Leisure items	13%	65%	More choices, Cheaper
Personal Service	3%	68%	More choices, Cheaper
Dining out	2%	69%	More choices, convenience because of work/study
Entertainment	51%	22%	More choices, Cheaper

According to the study, community stakeholders considered the prices of commodities and foodstuff in Tin Shui Wai relatively expensive as compared to those found in neighboring areas such as Yuen Long. Many blamed this increase in price on Link's monopolistic control over the retail locations within the town. Residents also believed that Link's control also negatively affects the variety of items available, and in some cases the quality of fresh food too.

Another issue brought up by one of the community stakeholders in the study was that the shops in the Kingswood Ginza, the major shopping center of the town, did not match the spending patterns of the community making it much less attractive and effective as a social town center. He believed instead that more low-end retail stores, such as those found in the Kingswood Richly Plaza, would suit the needs of the residents better.

The Kingswood Richly Plaza was sold to another investor in 1993 which led to the development of a much lower-end and diverse shopping center. This shopping center is much more consistent with the socio-economic background of Tin Shui Wai, and has provided a number of self-employment job opportunities for residents in Tin Shui Wai. However, the Kingswood Richly Plaza is only one shopping center detached from other retail outlets and therefore lacks retail cluster.

Interestingly, the study found that most surveyed residents in Tin Shui Wai did not welcome street hawkers, despite the predominant issue of expensive goods and food-stuff. In fact, the Food and Environmental Hygiene Department reported a recent increase in the number of complaints each year regarding hawkers, from between 470-610 cases in 2005, 2006, and 2007, to 1,917 in 2005, 3,360 in 2006, and 3,589 in 2007. These numbers show that the residents do not favor street markets, but instead would likely prefer a specified market area for hawkers and vendors (Law et al. 2009).

3 METHODS

3.1 Introduction

The aim of this project was to link aspects of urban design to the social and communal health of a city. Through background research we determined that street layout, building types and layouts and population demographics are the aspects of urban design that contribute the most to social and communal development. From this we developed a set of seven objectives listed below in order to accomplish our goal:

1. Observe, map and compare the building locations and uses of buildings in both towns
2. Observe, map and compare the street layouts of each town
3. Investigate the income diversity and demographics of the residents in both towns
4. Directly observe areas in each town by walking predefined routes and taking detailed notes about aspects of each town's urban form
5. Interview experts in the field of urban planning
6. Research previous surveys, group studies, and interviews of local residents in Tin Shui Wai
7. Create a list of recommendations to aid in the development of future new towns so their design may be more accommodating to the social and community needs of residents than their predecessors

It would be impractical to map and study all of both Sha Tin and Tin Shui Wai, so we selected 'study areas' in each town to focus our efforts. For Tin Shui Wai, a small town of only 430 hectares, we put our focus on a 300 hectare plot that contains all residential, commercial and leisure areas and excludes small outlying areas and the wetland park. Due to its size, it was not possible to focus on all developed areas in Sha Tin, so we selected a smaller portion to study.

The section chosen is 230 hectares in area and is located in the center of Sha Tin. The area is bounded by highways and includes Sha Tin Central Park, New Town Plaza, Sha Tin Wai, and City One Sha Tin. These areas are outlined in red on maps in Figure 1 and Figure 2.

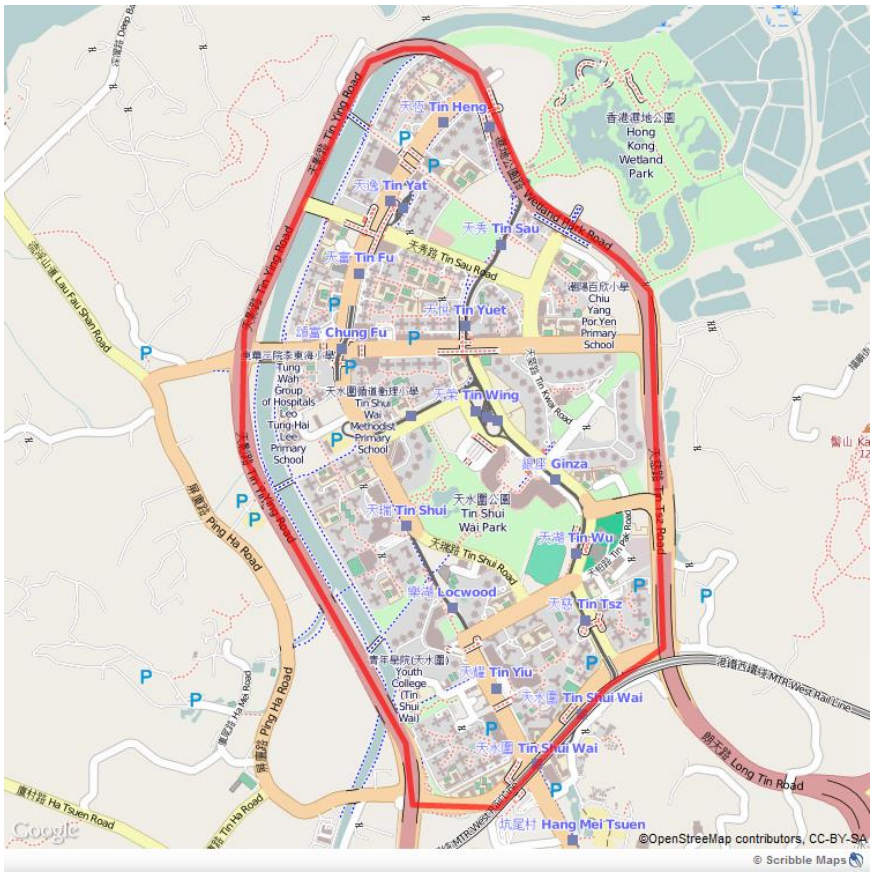

Figure 1
Study Zone in Tin Shui Wai

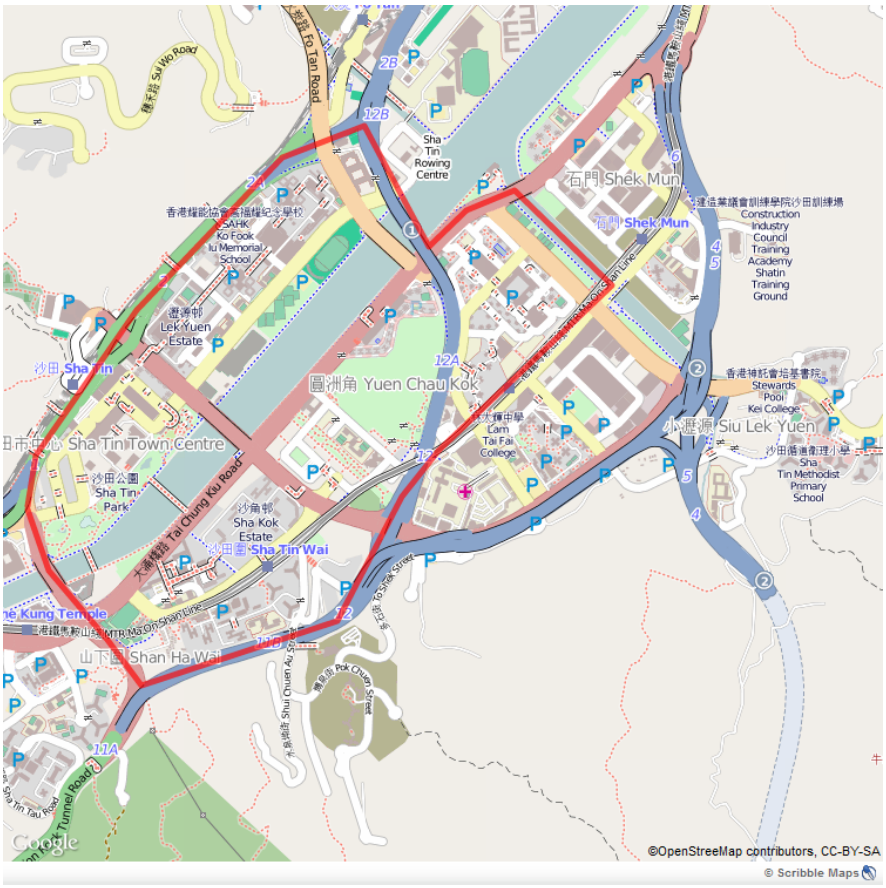

Figure 2
Study Zone in Sha Tin

3.2 Observe, Map and Compare Building Locations and Uses

When doing background research we felt that visualizing the layouts of both towns side by side would be a useful method for determining differences in urban design and discerning the effect those differences had on the quality of society in each town. After research we expected Tin Shui Wai's density to have an adverse effect on the distribution of buildings, availability of locally owned commercial facilities and access to public parks and open spaces. These maps were also used when developing our second objective as we noticed major differences in street layouts and pedestrian pathways. Additionally, they were utilized when planning routes to walk through the towns to complete objective four.

We began by printing large maps of the study areas in each town measuring approximately 70 inches tall by 36 inches wide. We then outlined different areas and buildings on each map with different colors depending on the area or building's use. The different areas highlighted were: public housing estates (blue); private housing estates (red); parks, sports grounds and public outdoor areas (yellow); shopping centers and markets (pink); schools (orange); churches (purple); community facilities (green); government buildings and areas (grey). Photographs of these maps as well as digitized versions of them can be found in Appendix D. Observations of the urban layouts and differences between the two towns and their potential impacts on social interactions can be found in the results section below.

3.3 Observe, Map and Compare Street Layouts

The width, layout and walkability of streets within a city are very important aspects of urban design. Not only do street layouts dictate the various ways in which people can travel throughout a city, they also determine underlying factors such as the size and types of buildings that can be placed around the streets, and the types of transportation that can be used to travel on them. Along with providing the residents of a city with pathways to walk or drive down, streets must give the city vibrancy and allow for chance social interactions among the members of the community (Moudon, 1991).

Our second objective was to map and compare the street layouts of both Sha Tin and Tin Shui Wai. The purpose of this was to gauge the number, types and quality of route options that a person could choose between when walking from one location to another with the idea that different people have different travelling preferences. For example, one person, to save time, might prefer to use the shortest or quickest route, while someone else might choose to travel

along the more scenic or vibrant route. A city with fewer or less appealing route options may appeal to a smaller population, which can cause a decreased probability for cultural blend and a smaller likelihood for sociability within the streets.

In order to properly analyze the street layouts of both Sha Tin and Tin Shui Wai, and to find similarities and differences between the two, we used a simple map editing tool called ScribbleMap. Separate maps were made to highlight the streets of both towns, including the arterial, local and terminal roads. Maps were also made to display the bike and walking pathways of both towns. Additional maps were made to showcase key areas in both towns that were exceptional or problematic. These additional maps included private housing developments in Tin Shui Wai, the intersections on Tin Wah Road in Tin Shui Wai and the elevated walkway network near the Sha Tin Sports Center. Lastly maps were created to highlight the light rail lines and stops in Tin Shui Wai and the MTR lines and stops in Sha Tin. These finished maps were then analyzed to reveal the general street patterns, ease of connectivity for pedestrians and transparency within both towns, which can be seen in the results section below.

Once the maps of the two towns' overall street layouts were completed, we set out to observe the street designs of more specific areas within them. The goal was to compare the various route options when travelling from one point to another within the two cities. To do this, we chose two points on each map that were likely to be walked between by an average pedestrian. More specifically, the two points chosen were a public housing estate and a park. We first found the two landmarks of interest on the Tin Shui Wai map. We then found two on the Sha Tin map that were relatively equidistant from each other in comparison to the two found on the Tin Shui Wai map. The next step was to draw out each of the potential routes between the two points on each of the maps using different color markers. Using these highlighted routes, we

made several comparisons. First, we looked at the points of interest surrounding each route such as schools, parks, shopping centers, and hotels and labeled them on each of the maps. Next, we counted and labeled the intersections that needed to be crossed whilst walking each of the routes, and labeled pedestrian walkways that allowed for an easy crossing such as pedestrian subways, overpasses, and/or pedestrian streetlights. Lastly, we labeled the width of each of the streets that needed to be crossed along each of the routes. A digitized version of the resulting maps can be found in Appendix D and conclusions from the comparison can be found in the results section.

3.4 Investigate Income Diversity and Demographics

Because the demographic composition of a city or town can have a major impact on the society and community within it, our third objective was to collect data on the demographics and income diversity in both towns. The purpose of this data collection was twofold. The first was that it was used for objective five to prepare interview questions about the potential effects that the demographics have on the community. Secondly, the information was utilized to find connections between the economic conditions in each of the towns, and the lack of social interactions among residents. Our background research suggested a connection between a poor economy in Tin Shui Wai and a lack of street side shops that could improve the vibrancy, walkability and community of the city if present. Other data points were chosen to validate previous research that indicated possible commuting, population density, and housing imbalance problems. The data also gave us a better understanding of how our two study areas compare to each other.

To gather this data, we compiled census data from Centamap.com. Centamap is a Hong Kong digital map website that obtains data from the Survey and Mapping Office of the Hong Kong government. The website contains census data of the demographics, education, economy,

and housing for each district within Hong Kong. We used Centamap to gather data pertaining to the resident population, population density, monthly household income, and the number and type of housing units within each of the two cities. These housing units included public rental, subsidized sales flats, and private permanent flats. The percentage of residents working within the towns, and the average number of people commuting to work using the MTR, bus, walking, Public Light Bus (PLB) and other methods, as well as the average monthly income of households in each town were also recorded. Each data point was calculated from totals and averages provided for each housing estate in our study areas on the Centamap website. All data compiled was organized into tables and placed in Appendix C.

3.5 Directly Observe Urban Form by Walking Predefined Routes

In order to get a better understanding of the walkability of the towns on a personal level, we planned multiple walks through each town going from one point of interest to another. During the walks we took notes on aspects of the towns that pertain specifically to walkability and sense of community including the following:

- The number of people walking on the street and demographics of those people
- The diversity of building types along the streets
- The diversity of social scenes on the street
- The types of shops present and the transparency of those shops
- The amount of greenery and how it adds to the overall aesthetic of the walk
- Presence of weather protection
- Cleanliness of the path
- Length and frequency of walking interruptions
- Interactions among residents

In each town we planned out the following three walking trips that pertain to a common activity within the town:

1. From a housing development to the main town shopping center
2. From a housing development to a large city park
3. From a school to the main town sports grounds

For each trip we chose multiple routes to walk between two locations that fit the criteria for each trip. These routes can be seen in Figure 3 and Figure 4. In each figure trip number one above is drawn in purple, trip two is drawn in green and trip three is drawn in orange. More detailed pictures of each route can be found in Appendix D. In both towns, the housing development for trip number one was chosen to be both a development with a smaller nearby shopping center and reasonably far away from the main shopping center to simulate a longer walk meant for the pleasure of walking rather than convenience (the light rail in Tin Shui Wai and the MTR in Sha Tin provide a faster trip). For trip two, the development was chosen to be a moderate length from the large park representing a walk that should be both pleasurable and convenient. Lastly for trip three, the school was chosen to be a moderate distance from the sports grounds to simulate a trip a child might choose to walk or take public transit depending on the quality of the area.

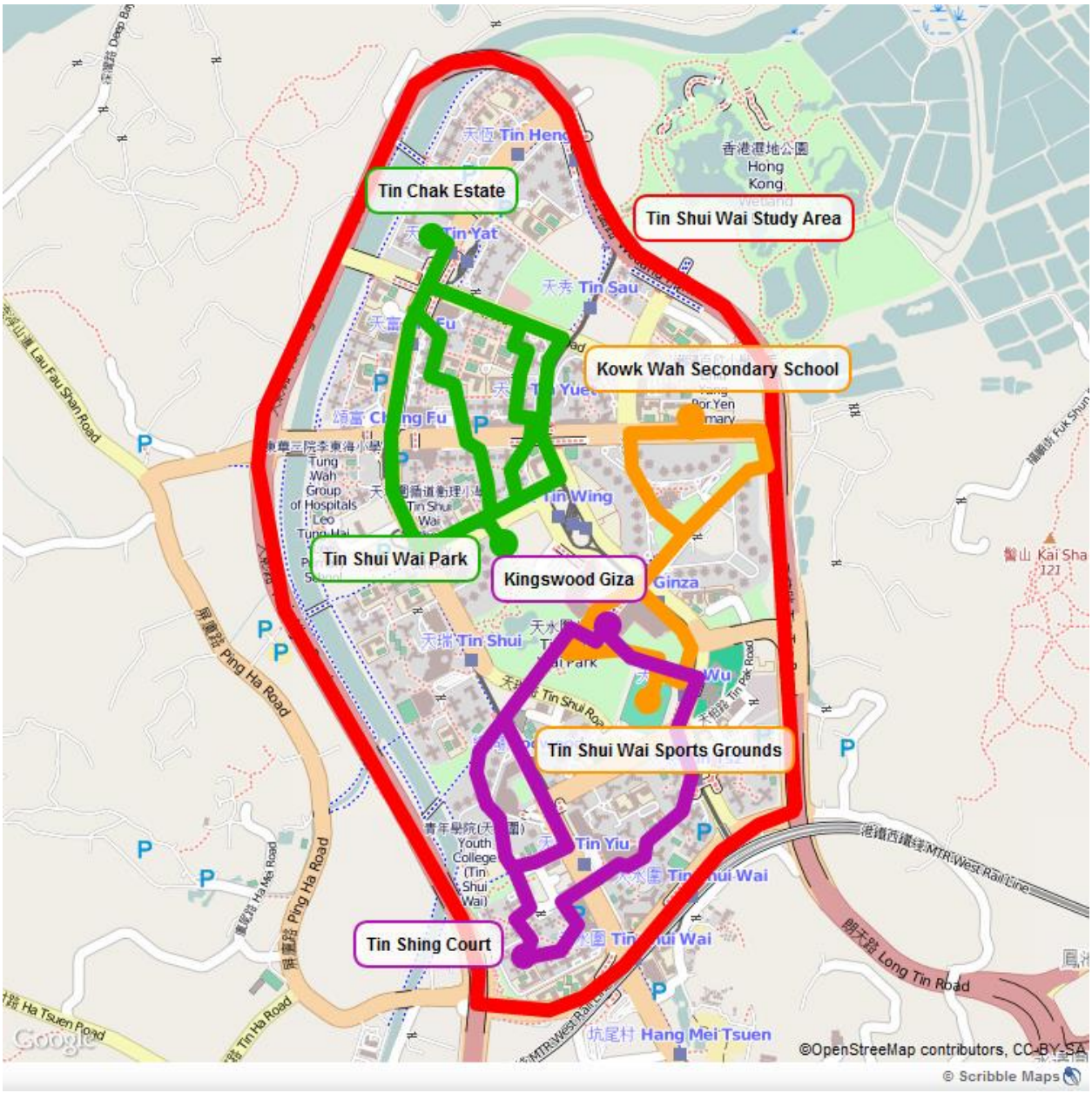

Figure 3
Planned Walking Routes in Tin Shui Wai

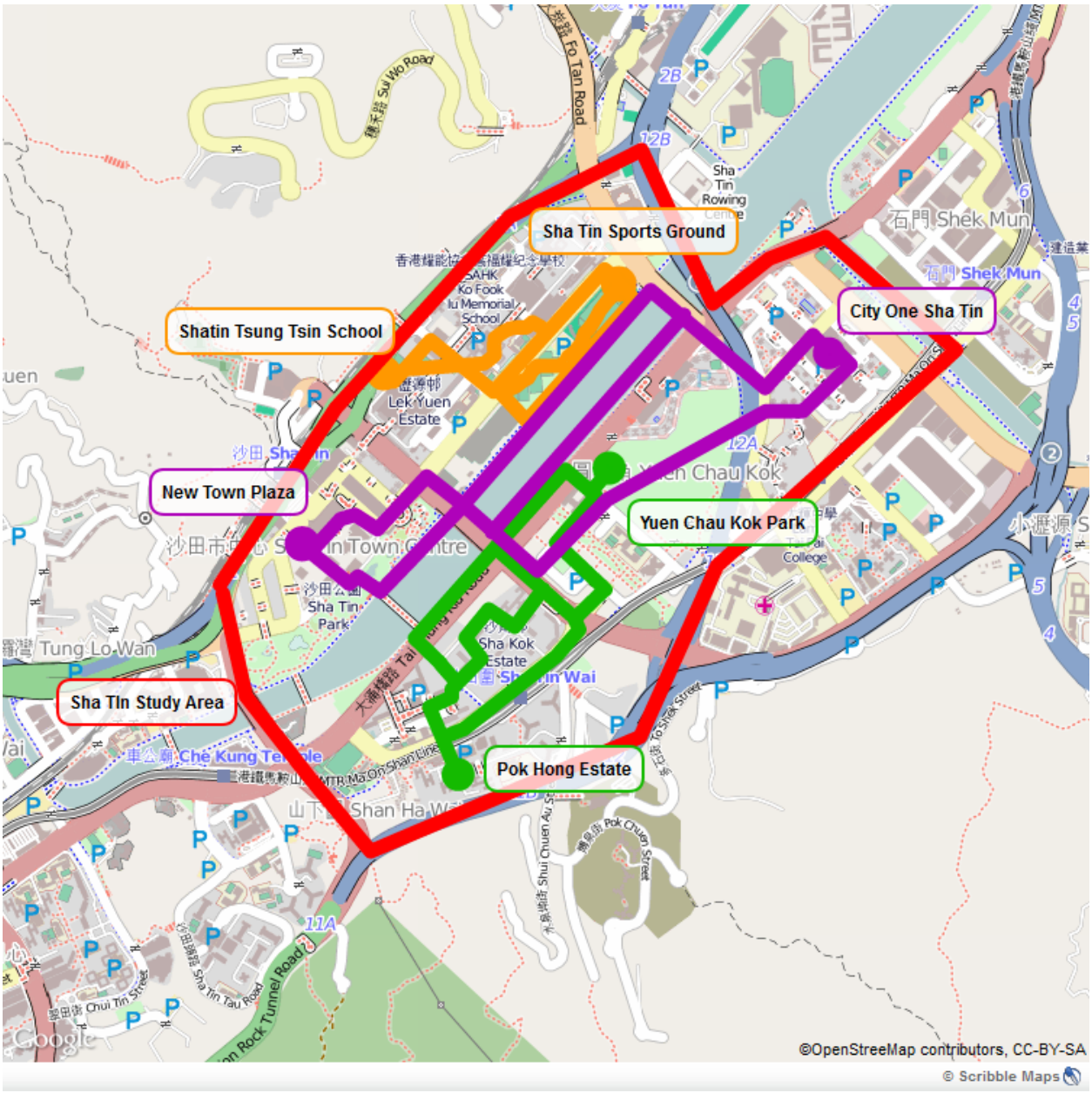

Figure 4
Planned Walking Routes in Sha Tin

While attempting to walk the chosen routes in Sha Tin we became continuously sidetracked and drawn to different areas along the path to our destination. Because of the implications of this phenomenon for the walkability of Sha Tin, we elected to photograph and document the routes we actually took instead of attempting to follow the preplanned routes. This

did not happen in Tin Shui Wai. The actual routes taken in Sha Tin can be found in Appendix D. A detailed conclusion demonstrating the results of these walks can be found in the results section below.

3.6 Interview Experts in the Fields of Urban Planning and Sociology

Our fifth objective was to interview experts in the fields of urban planning. This allowed us to gain a better understanding of urban design and society from the perspective of people who live and teach in Hong Kong. It also helped us clear up ambiguous points in our background research and answer any questions we could not answer ourselves through fieldwork or research.

We chose to interview one of our sponsors, Professors Hendrik Tieben, as an expert on urban planning. Professor Tieben is currently an Associate Professor and the Director of the Masters of Science in Urban Design Program at the Chinese University of Hong Kong's School of Architecture. We asked him questions about the history and his opinions on the urban design of both Sha Tin and Tin Shui Wai, and what he believed to be main reason for the failure of Tin Shui Wai. We also asked him general questions about Hong Kong society and how he thought urban design could be used to foster community growth in new towns.

Also from the university, we selected Professor Mee Kam Ng to interview because of her research interest in community planning. She is the director of the Urban Studies Program at the Chinese University of Hong Kong. We asked her questions similar to the ones we asked Professor Tieben about urban planning. We also added questions about Hong Kong society and community, how having good income diversity contributes to having a strong sense of community.

The interview questions as well as the transcripts from the actual interviews can be found in Appendix B.

3.7 Research Previous Surveys, Group Studies, and Interviews of Local Residents

In order to learn about the opinions of local residents about their town, a number of previously taken surveys, group studies, and interviews were examined. These surveys revealed the thoughts of local residents on available facilities, commercial centers, markets, and housing selections. The surveys also highlighted certain deficiencies within the local facilities and major complaints that residents had regarding them. We used these surveys to complement our own findings and other research with the opinions of local residents to develop a more complete analysis of the situation in Tin Shui Wai.

In 2009, the Department of Social work and Social Administration from the University of Hong Kong conducted an extensive study on the Tin Shui Wai area with the intent of developing a set of guidelines for the future development of new towns. In this study a number of surveys were taken in Tin Shui Wai, including a street survey of 108 shoppers in retail outlets and 105 users of public/community facilities. 502 households were also surveyed. The surveys were focused on the usage of local facilities compared to out of town facilities and the reasons for using outside facilities. The results were then compiled to create various statistics that can be used to highlight certain deficiencies within Tin Shui Wai (Law et al. 2009). These results have been summarized and tied into our own findings in the results section below.

3.8 Create a List of Recommendations

The goal of this report was to conclude with a list of recommendations for developing future towns' designs that better accommodate the social and communal needs of residents. These recommendations are based on conclusions drawn from our own findings as well as from background research. They pertain to the layout of towns including zoning policies, their density and housing policies, the use of natural scenery and the walkability of their streets. Our

suggestions as well as a pros and cons list of the features of each town can be found in the results section.

4 RESULTS AND ANALYSIS

4.1 Introduction

In this chapter we will present, discuss and analyze our findings. The chapter will begin with an analysis of census data obtained from the Centamap website. It will then present each map created and our observations about it as well as our analysis of those observations. The analysis will tie the observations into previous background research as well as information from our interviews with Hendrik Tieben and Mee Kam Ng and the demographic data presented. Additionally, this chapter will present our direct observations from walking through and experiencing the towns using visuals when appropriate. It will conclude with a section stating our recommendations for future new towns.

4.2 Analysis of Demographics and Income Diversity

The CentaMap website was used to obtain census data about the demographics and income diversity of each town. The data collected pertained to the resident population, population density, balance of public and private housing, percentage of people working in the same district as their residence, modes of transportation residents use to get to work, and the average monthly income for public and private households within the study areas of both towns. Sha Tin's statistics are more congruent with those of Hong Kong as a whole, while Tin Shui Wai's statistics validate certain problems that the group had already expected due to previous research. The Sha Tin study area is only seventy-five percent the size of the Tin Shui Wai area and so, as a result, there were some obvious discrepancies between the statistics. The resident population of Tin Shui Wai is double that of the Sha Tin study area, making Sha Tin's population density sixty-four percent of Tin Shui Wai's. Tin Shui Wai's main issue is that seventy-five percent of the housing is public. Fifty-eight percent of this proportion is rental

housing, which, in addition to creating a severe housing imbalance, reduces the overall income diversity of the town. More specifically, the average income of the town is skewed to a much lower figure because rental housing in Tin Shui Wai is predominantly used by poorer people. Sha Tin on the other hand has a good housing balance. Forty-eight percent of its housing is private-permanent and only forty-three percent of its housing is public-rental. There is a $20,000 gap between the average private household income and average public household income within Sha Tin. The same gap is only $12,000 for Tin Shui Wai implying that Sha Tin has more weathler privately housed residents. About twenty-five percent of employees within both towns work within the same district as their respective town. In Tin Shui Wai, eighty-two percent of the working population depend on the MTR or buses to get to work, while only seventy-two percent in Sha Tin do the same. Twice as many residents walk to work in Sha Tin, which is likely due to the absence of an unnecessary light rail network within the city.

4.3 Observations from Maps

4.3.1 Building Locations and Uses

Several major differences in the urban layouts of Sha Tin and Tin Shui Wai were observed after mapping the building locations and uses of each town. The map of Sha Tin can be seen in Figure 5 and the map of Tin Shui Wai can be seen in Figure 6. These differences were found to have varying effects on the communal aspects of each the towns. The first of these observations, when comparing the urban design of both towns, was the difference in building density. The public housing estates in Tin Shui Wai average ten to twelve buildings per estate, while the average number of buildings in the public housing estates in Sha Tin were only about five or six. Given that Tin Shui Wai has three times the population density of Sha Tin, it follows that Sha Tin would have more space between and around buildings than Tin Shui Wai. Sha Tin

does in fact have fewer buildings per hectare in general, allowing more land to be used for parks, streets and walking paths. The streets of Sha Tin penetrate the housing estates, which creates a network of walking paths and sight lines. This street layout gives the town a greater level of connectivity and transparency. These two factors alone greatly help entice people to come out and walk around the streets.

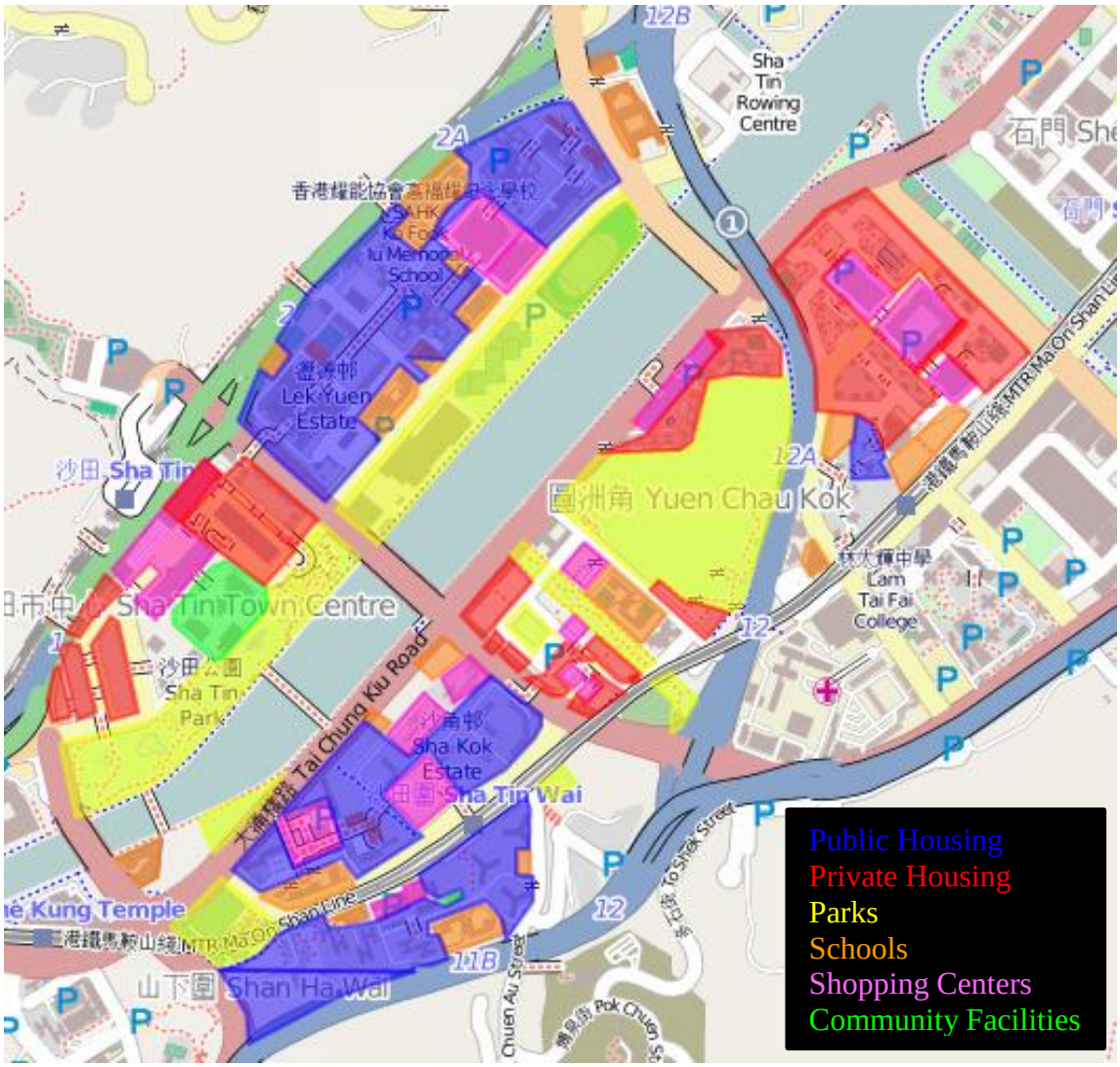

Figure 5
Building and Area Usage in Sha Tin

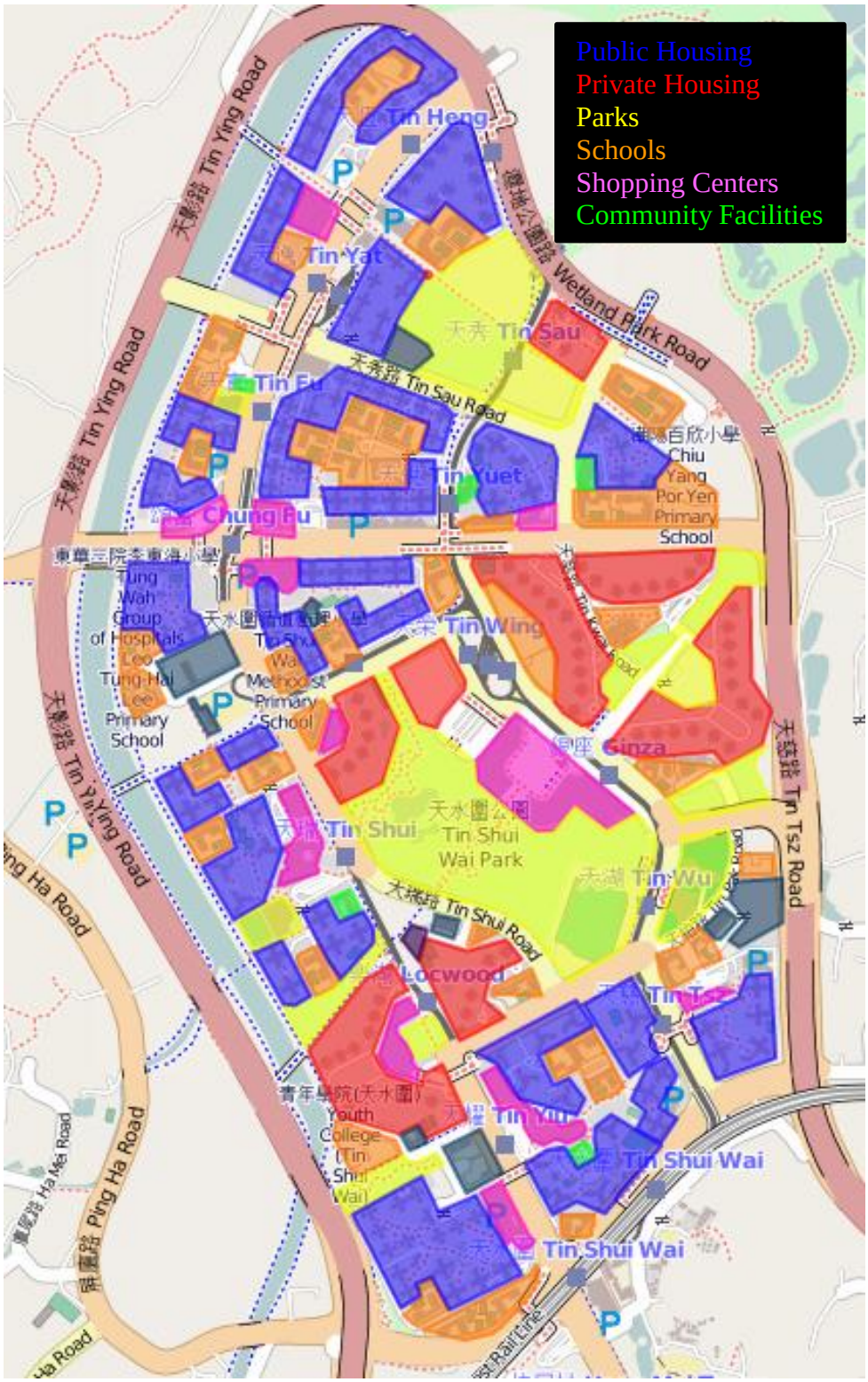

Figure 6
Building and Area Usage in Tin Shui Wai

Tin Shui Wai, on the other hand, contains a large number of high-rise housing developments very close in proximity, which creates a visually impenetrable wall of buildings with very few open gaps between them. A resident of Tin Shui Wai can easily feel trapped as they walk around town. In general, the streets of Tin Shui Wai are designed to benefit vehicle traffic more than pedestrian traffic.

To achieve proper connectivity, it is important to provide easy access to public facilities and spaces. Sha Tin Central Park and the Sha Tin Sports Ground occupy one side of the Shing Mun river waterfront. These parks are central to the town and are directly adjacent to both private and public housing estates making their location ideal for everyone within the town. In contrast, Tin Shui Wai contains only a few parks that are clustered in a small area surrounded by gated private housing estates. These gated estates alone account for almost 20 percent of the land area of Tin Shui Wai and are inaccessible to the public housing majority. Figure 7 shows the gated private housing estates highlighted in black with the parks highlighted in green. Pedestrians have to walk around the private estates to access entrances to the park, as the parks themselves are gated. Because the parks are surrounded by private housing, there is a sense of exclusivity preventing the parks from being considered truly public spaces.

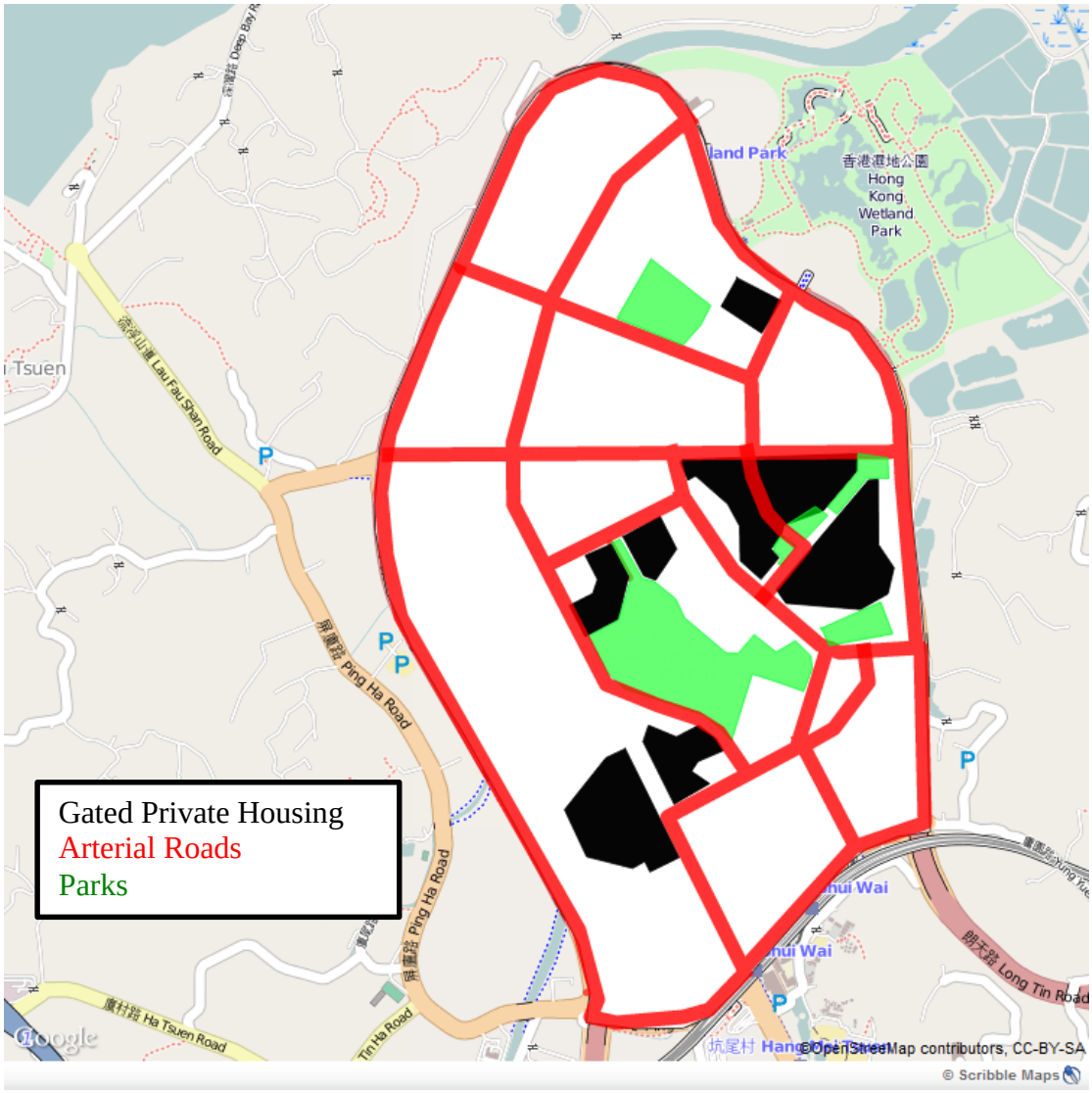

Figure 7
Gated Off Areas in Tin Shui Wai

The segregation of facilities and housing estates within Tin Shui Wai is even more pronounced due to the modular design of the town itself. Almost every housing estate within Tin Shui Wai contains its own small shopping center, schools, and in some cases, community center. This design model alienates the different estates from each other and makes the experience of living in the estates strictly functional. There are little opportunities for leisurely strolls or chance social encounters if the residents have no reason to travel out of their own estates. Sha Tin still

suffers, to a lesser extent, from segregation due to the separation of the major public and private developments by large arterial roads. The overall design of these areas, though, is commendable. There are multiple shopping centers, wet markets and an MTR stop at each of their centers. These miniature town centers offer residents a central hub to travel to, congregate, and buy goods. There are also Dai Pai Dong stalls and wet markets in the public housing communities. Additionally, located within the private housing estates are high end restaurants and a greater selection of clothing stores. The diversified distribution of services across the town influences people to travel to other areas to experience the differing activities, goods, and people that encompass Sha Tin. Furthermore, Sha Tin has one unifying community center, which contains a banquet hall, town hall, public library, and marriage registry further integrating the town as a single entity.

4.3.2 Street Layouts

The streets of a town dictate how pedestrians and cars can move throughout it. Tin Shui Wai's network of streets is essentially a tributary pattern where convenient connecting side streets are replaced with dead-end loops and cul de sacs. To be more specific, Tin Shui Wai is made of 8 local through streets and one large arterial road that slices through the middle of town like a small highway. Figure 8 shows the street layout of Tin Shui Wai with streets highlighted in black. All roads that filter off the eight through streets are cul de sacs and loops. The cul de sac street pattern creates several problems, the most important being large block sizes. The massive blocks of Tin Shui Wai are occupied by either private or public housing developments with only the latter of the two containing pedestrian through-ways. The public housing complexes, though, often have sparse entry points, which can sometimes make it an inconvenience to walk through them.

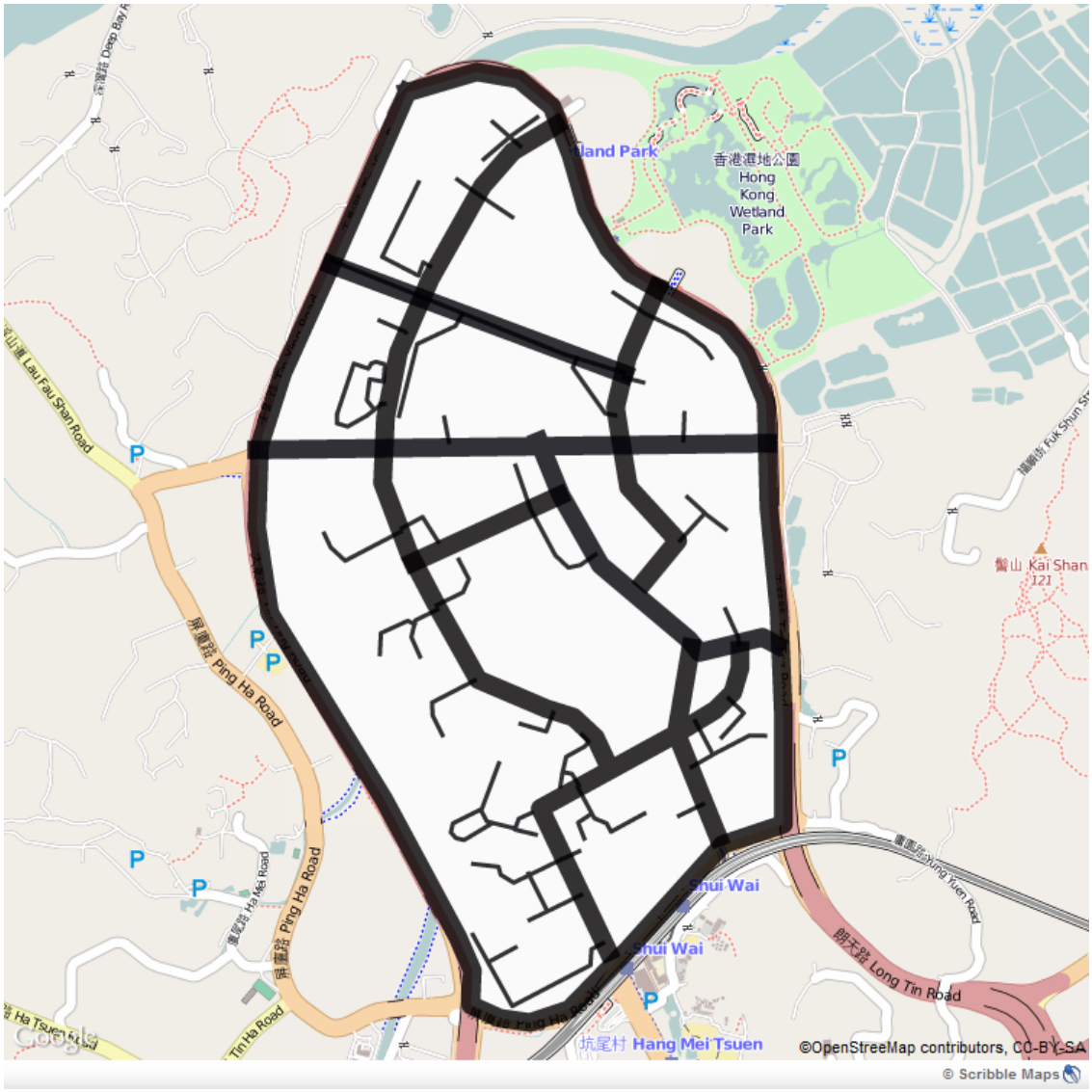

Figure 8
Street Layout of Tin Shui Wai

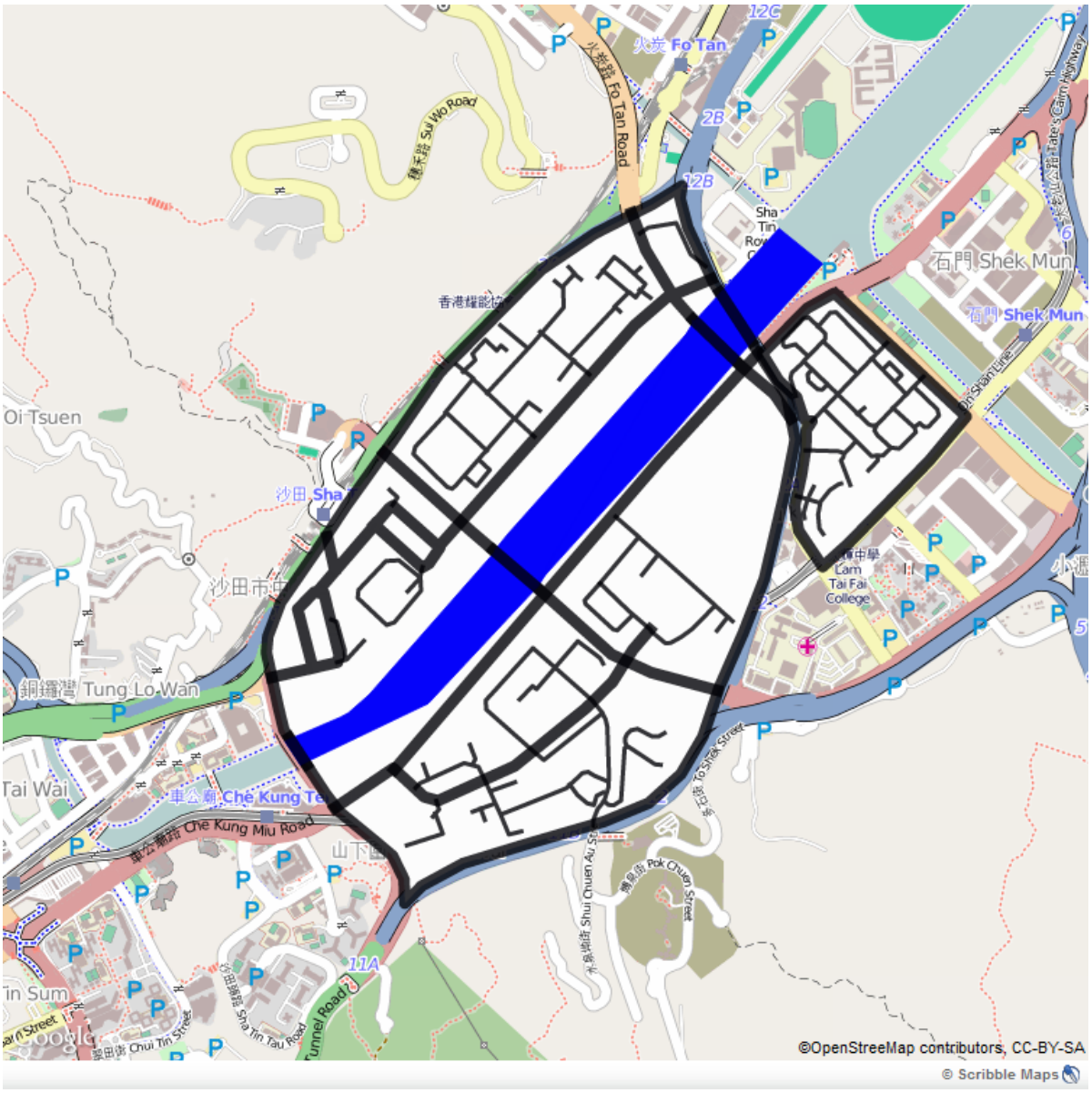

Figure 9
Street Layout of Sha Tin

In terms of walkability and the levels of connectivity, safety, comfort and vibrancy, Tin Shui Wai has some major failings. The minimal streets of Tin Shui Wai force pedestrians to travel on indirect pathways and force cars to congest the few roads available to them. The streets of Tin Shui Wai are generally very wide so that they may grant enough room for cars to travel easily, but, unfortunately, also create long, multistep crosswalks for pedestrians. The wider

streets also invite cars to travel faster, which diminishes the sense of safety that the pedestrian experiences. Furthermore, wide streets coupled with the high fences of the housing estates negatively distort human scale and pedestrian comfort. In essence, the streets in Tin Shui Wai are high speed arterials that offer nothing to the pedestrian and everything to the car.

Tin Wah Road is the worst example of a major arterial road as it separates the southern and northern ends of Tin Shui Wai. The road, shown in Figure 10, runs two lanes in both directions for approximately 1700 meters, and suggests a max speed limit of 30 miles per hour, which is often disregarded by vehicles. This arterial road provides four elevated walkways to cross the street, which are highlighted in red, though three of these walkways are within a 150 meters distance to each other to accommodate the pedestrians using the Chung Fu light rail station. In contrast, there are only three crosswalks, shown as green circles, on street level with an average distance of 415 meters between each, which disproportionately covers nearly 75 percent of Tin Wah Road's length. Small fences also line the road, confining the pedestrian's ability to cross the street to the seven walkways stated above. In order for the people of the northern public housing estates of Tin Shui Wai to travel to a shopping center, Tin Shui Wai Park, or the MTR stop, they must traverse this massively inconvenient road. Because of this, the northern residents most definitely prefer the light rail, which perpetuates the issue of having few people walking the streets of Tin Shui Wai.

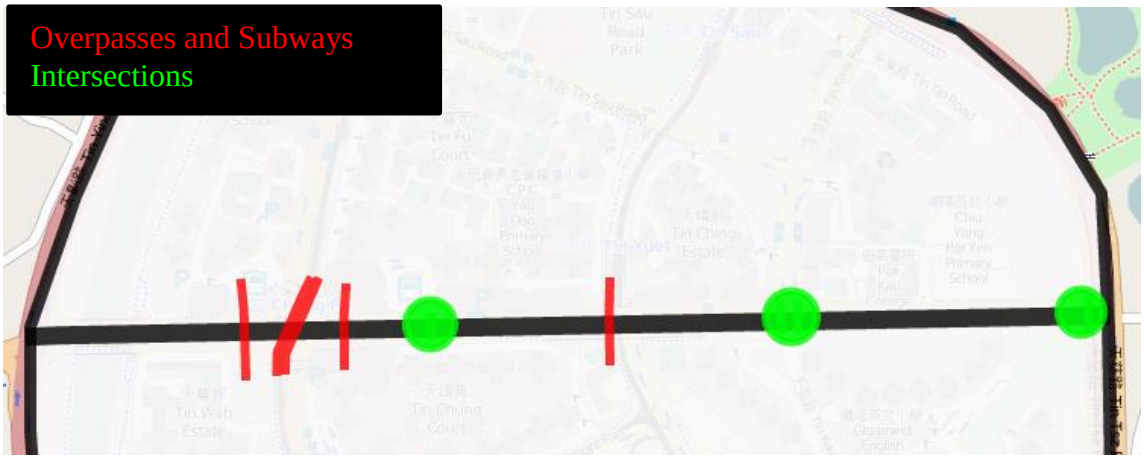

Figure 10
Intersections and Footbridges on Tin Wah Road in Tin Shui Wai

Sha Tin, on the other hand, boasts variations of the grid street layout network, the ideal layout of the most walkable cities in the world and can be seen on Figure 9. A grid street pattern is one that is coherent, and legible in its street hierarchy and pathways. City One, Sha Tin is the ideal example of this grid street pattern in Sha Tin. The grid pattern equates to having more through roads, which creates smaller block sizes. Smaller block sizes provide more route options for the pedestrian and because most of the buildings in City One are mixed use, the different routes will have different aesthetical highlights, such as various shops and landmarks. The grid street network also lends itself to creating potent sight lines. Strong sight lines are a theme in Sha Tin, as buildings are spaced evenly to reveal through ways. The Shing Mun River also opens up the town layout and is the town's backbone, informing the design of Sha Tin's grid layout.

Elevated pathways are often used to protect pedestrians from dangerously fast street traffic but in the case of Sha Tin, elevated walkways are used to provide pedestrians with a more convenient way to travel around town. Behind the Sha Tin sports ground, there is a network of elevated walkways covering a 900-meter distance, which connects the entire public housing community surrounding it. This network is shown in Figure 11 with buildings shown in blue,

streets highlighted black and overpasses shown in red. The elevated walkway network travels from the private housing complex, Lucky Plaza, directly to the end of the study area at Fo Tan Road. Along the way, these elevated walkways infiltrate various public housing estates, markets, and plazas, and negate the need to walk on the street almost entirely. These walkways were not built out of necessity, but more so to give residents a luxury. The streets of this area are not dangerous at all and offer a modest network of routes in their own right that residents can easily navigate if they choose. Assuming most residents use this walkway network, chance encounters are almost guaranteed to occur within the confines of the buildings along the walkway. On the other hand, though there is an undeniable convenience of having one direct path to almost all necessities, having so many elevated walkways takes away from street life and vibrancy. Although the elevated walkways do a strong job connecting the area physically, they also take away the natural social connections that can occur on the street level.

Figure 11
Sha Tin Pedestrian Overpass System

After mapping the possible route options when walking from a public housing estate to a park in each of the towns, several observations were noted regarding the street layouts of each. In terms of numbers, the street layout of Sha Tin is clearly a better design than that of Tin Shui Wai. For example, when walking from Pok Hong Estate to Yuen Chau Kok Park in Sha Tin,

there are four major route options available. The maximum number of large intersections that a person would cross when walking any of these routes is two, with the minimum being one. Additionally three out of the four routes pass by a shopping center, two pass by a park, and one of them lies adjacent to the river, making it the more scenic route of the four. In comparison, when walking from Tin Chak Estate to Tin Shui Wai Park, there are a total of three possible route options. Two of these three routes must cross over four large intersections, and the other route must cross over three. Two of these routes pass by shopping centers, one passes by a park, and, unfortunately, they all cross over the tracks of the light rail. The Sha Tin Route Map can be seen in Figure 12, and the Tin Shui Wai Route Map can be seen in Figure 13. The buildings outlined in orange are schools, the buildings outlined in pink are shopping centers, and the areas outlined in yellow are parks.

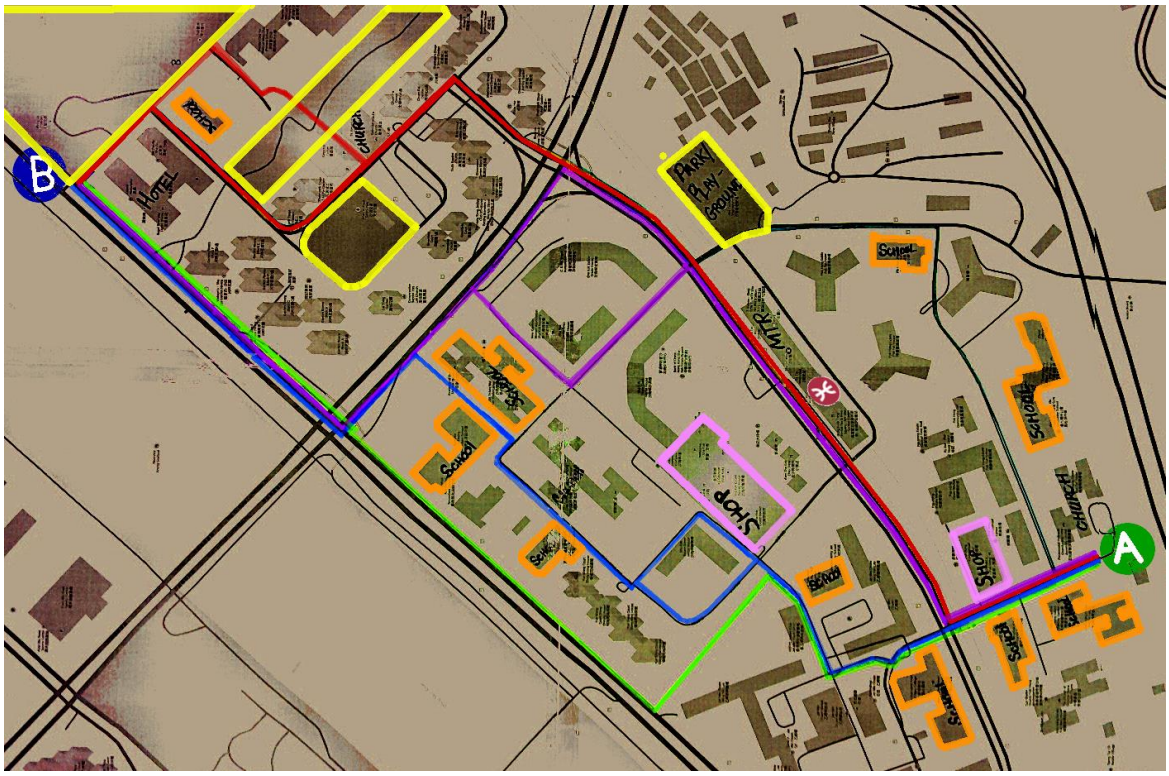

Figure 12
Route Options in Sha Tin

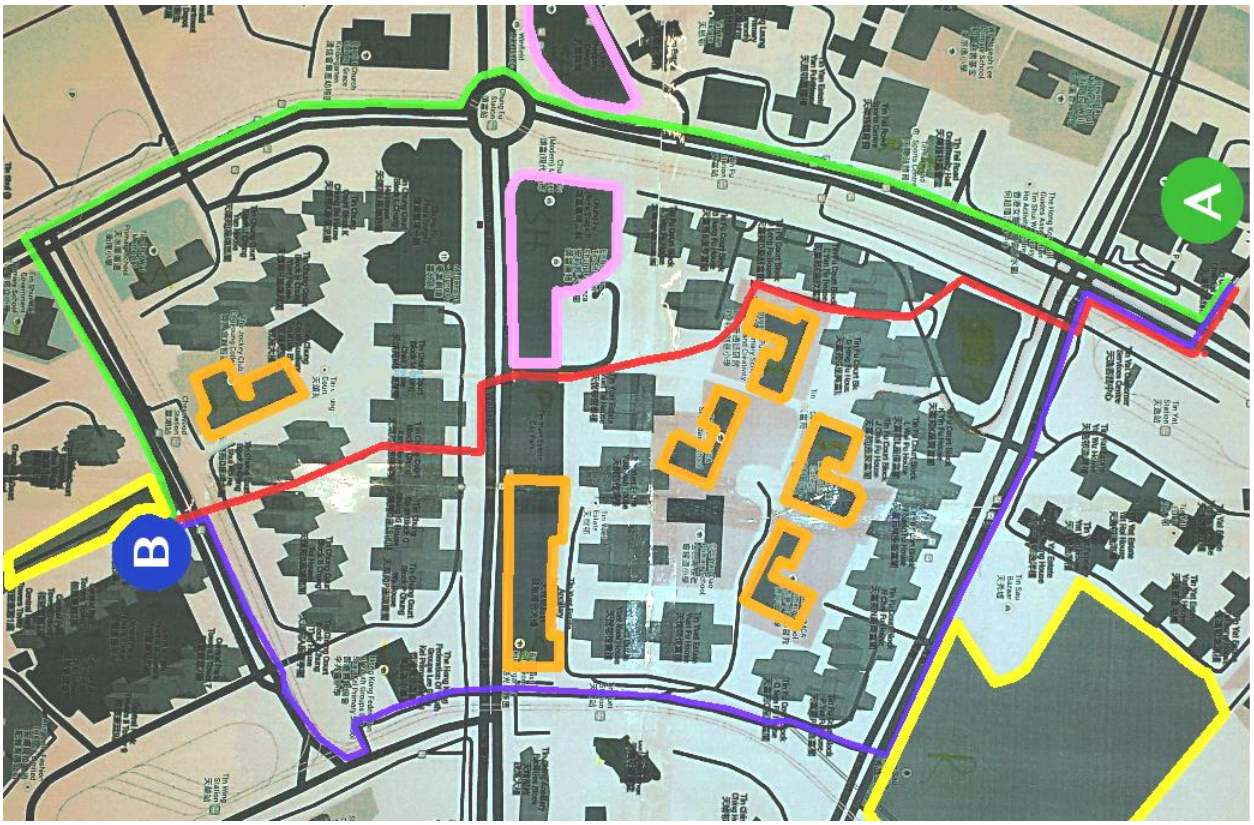

Figure 13
Route Options in Tin Shui Wai

Many conclusions about the street design of each town can be drawn from an analysis of these numbers. For instance, due to the high number of large intersections that need to be crossed in Tin Shui Wai, travelling to the park becomes a very inconvenient and undesirable task. As a result, the park is generally more sparsely populated, and members of the community will only travel to it if it is completely necessary as a means of shortcutting through the city center. Another hindrance to pedestrian traffic in Tin Shui Wai is the light rail system. The light rail tracks run throughout the entirety of Tin Shui Wai, and very seldom can a person walk anywhere in the town without needing to cross them. This forces pedestrian flow toward elevated walkways and underpasses, which can be an inconvenience if they are out of the way of a person's destination.

Several of the routes on the Sha Tin map pass by an MTR, which can provide benefits to the community surrounding it. For example, the MTR brings an influx of people who are boarding the trains and leaving them. This makes a perfect spot for shops and other activities, in turn making the walk through that area more enjoyable. On the other hand, for those people that want to walk from the Pok Hong Estate to Yuen Chau Kok Park, but want to take a more scenic route, there are two route options that travel through an area of smaller local streets, and one route option that travels completely along the river. The diversity of route options allows pedestrians to travel between spaces without losing interest in the walk itself. Unfortunately, in Tin Shui Wai, two of the route options are very similar to each other because they are both along large arterial roads. The third route option travels through a public housing estate, which seems to be both the most efficient and most interesting route. Unfortunately, as a result, the other routes are much less desirable to travel on, only decreasing the diversity of route options.

4.4 Direct Observations

4.4.1 Pedestrian Walkways

The layout and design of the roads in a town can have a major impact on pedestrian traffic. In Tin Shui Wai, the majority of walkways on grade with roads are separated from pedestrian walkways by continuous guardrails, and even smaller to medium sized roads often have concrete or metal dividers. This makes it impossible for pedestrians to cross a road except at designated crosswalks or overpasses, even if the road is a narrow one that does not have a lot of traffic. Foot traffic is further hindered by a large number of stop lights, with many crosswalks containing not one but two lights that force pedestrians to stop and wait twice just to cross a narrow street.

In Sha Tin, most walkways on grade with small to medium sized roads do not have guardrails, allowing pedestrians to cross roads at any time. Only walkways bordering larger roads have rails, and these were few as the pedestrian walkways are typically separate from major roads. A large number of crosswalks are available at regular intervals, most of which do not contain traffic lights. Major roads and intersections are typically crossed by a network of over and underpasses, which means that pedestrians do not have to wait for traffic lights at large crosswalks.

Navigation through Sha Tin is very seldom a difficult task due to an abundance of signage, visibility across the city due to open areas (Figure 14), and proper spatial design between buildings. Along with signs indicating street names of nearly every road in Sha Tin, there are often indicators pointing toward points of interest, such as the closest MTR station. These signs make it very difficult to get lost in the city. Though the signage in Tin Shui Wai is generally as prevalent as Sha Tin, it can still be very easy to get lost. The reason for this is the placement of the buildings throughout the city. In Sha Tin, buildings are located in line with each other, allowing pedestrians to be able to see through gaps between them to the next street over. This opens area for shortcuts all over the city along with generally more visibility throughout. On the other hand, as the image in Figure 15 illustrates, the buildings in Tin Shui Wai are situated in such a way that there is seldom a visible gap between them. This creates a sort of maze effect that severely hinders one's ability to navigate throughout.

Pedestrian sidewalks run adjacent to nearly every street in Sha Tin, even the ones that are smaller and more sparsely populated, making walking through the city a safe and enjoyable experience. The width of the sidewalks is generally directly proportional to the speed of the cars on the street, and the population density of the people walking along it. For example, Ngan Shing

Street outside of Fortune City Plaza has very wide sidewalks to accommodate the large number of people going to the shops along the road, and ensure that congestion is limited. These sidewalks also allow for higher speed limits on that road and less interaction between cars and pedestrians. Additionally, on many roads, there are individual bike paths separating cyclists from pedestrians, eliminating the need for the two to be concerned with avoiding one another. Apart from attracting tourists in search of an easy way to navigate the entire city, these bike paths provide a convenience for those that cannot afford a car, but also desire a higher speed of transportation than walking. On more busy streets such as the main roads that cross the bridge over the water, these two paths are completely gated off from the high speed cars that are driven on those roads.

Including pedestrian subways and sky-walkways is very important when designing a highly populated city such as Sha Tin, due to the various advantages of these structures. Firstly, they reduce pedestrian congestion around larger roads such as busy streets and highways by allowing people to cross them without the need to wait at a stoplight. Consequently, vehicle congestion is also reduced due to the elimination of these stop lights. Separating pedestrian walkways from high speed vehicle transportation roads is an important factor in increasing the feeling of safety and walkability of that road. In turn, this leads to a more enjoyable walk for the average person traveling throughout the city.

The location and number of these walkways are also very important. For example, the inclusion of too many pedestrian overpasses or subways will decrease the amount of interaction between the pedestrian and the city, therefore making it less desirable to walk throughout it. In addition, positioning these walkways in unnecessary locations such as a sparsely populated area,

or a road with low traffic speeds and little vehicle congestion can actually be detrimental to the sociability of that area.

Figure 14
Sha Tin – View from elevevated walkway over Sha Tin Wai Road demonstrating clear line of sight
(Photograph taken by Nathan Ford)

Figure 15
Tin Shui Wai – View from elevated walkway over Tin Yui Road demonstrating lack of visibility
(Photograph taken by Nathan Ford)

4.4.2 Importance of the River and Open Spaces

Large natural landmarks such as the river running through Sha Tin create open areas that can benefit a city in many ways. Open spaces can make a crowded city seem more spacious by extending the distance residents can see. In cities such as Tin Shui Wai where high rises are densely packed together, it becomes impossible to see past the endless wall of buildings, which creates a claustrophobic atmosphere. Combined with the lack of significant open spaces, both within the town and farther out in the distance, it becomes almost impossible to even catch sight of the sky apart from at the very edge of the city. Sha Tin, on the other hand, contains the river running through the center, hilly areas in the outskirts of the city, and a more spacious layout in which buildings are not as clustered together. Some of these features can be seen in Figure 16. The combination of these factors allows residents to experience open-air at nearly any point within the city and creates the impression of space and openness.

Apart from the aesthetic benefits, large open areas can also improve the walkability of towns by making them easier to navigate. Significant landmarks such as the river in Sha Tin give residents a point of focus, and having sight of the sky at all times makes it much easier to maintain a bearing. In Tin Shui Wai, the "prison" of buildings creates a very dull and repetitive landscape where it is easy to become lost (Figure 17). The dense placement of buildings blocks pedestrians' views of any distant landmarks and makes it difficult to maintain a direction while navigating around blocks.

Figure 16
View of Sha Tin from Yuen Chau Kok Park demonstrating moderate building density
(Photograph taken by Nathan Ford)

Figure 17
View of Tin Shui Wai from wetland area demonstrating high building density
(Photograph taken by Nathan Ford)

4.4.3 Private Housing

One feature that contributes to the success of Sha Tin is its lack of gated private housing estates. This absence of boundaries makes the city feel more welcoming in general, and it allows pedestrians more route options while walking throughout. For instance, when walking from one point to another, a person is able to walk in between two private housing buildings rather than around them, making for a quicker travel time, and oftentimes, a more scenic route. In the vicinity of many private housing estates within Sha Tin are small marketplaces that attract locals and tourists alike. The combination of these marketplaces and the lack of boundaries among these estates creates a breeding ground for culture and sociability.

Another feature of Sha Tin that increases the vibrancy of the town is that instead of having only a few large private housing estates, it has many smaller estates side-by-side to each other. The buildings of each private housing estate are different in structure, color, and design, which makes the entire landscape of buildings much more attractive aesthetically. This feature helps to increase the enjoyment had when walking around through the city. In addition, the placement of each of the buildings in relation to each other is very important. Many of the housing buildings are aligned in such a way that when standing between two of them, it is possible to see through to the next two or three blocks ahead.

Contrastingly, the private housing estates of Tin Shui Wai are generally large areas gated off to nonresidents. Though the boundaries that surround these estates provide privacy and safety for the residents living in them, they have several negative impacts on the rest of the community. For example, Kingswood Villas, located on the western and eastern borders of the town, occupy a significant amount of land in relation to the land area of the entire city. Because they are gated communities, they effectively eliminate the number of potential travelling routes through those

areas in addition to having a shrinking effect on the size of the already small 400 hectare plot that Tin Shui Wai sits on. Many of the private housing estates have schools contained within them along with shopping centers that are generally very close. This makes travel throughout the city needless, and significantly reduces the general flow of pedestrians through the streets. This lack of interaction between the people living in private housing and the rest of the city contributes greatly to the poor sociability of Tin Shui Wai.

4.4.4 Blending Natural and Urban Environments/Parks

The seamless blend between natural and urban environments in Sha Tin contributes greatly to its attractiveness and make it an enjoyable city to traverse. Although it may look and feel like a busy urban center, Sha Tin is filled with vegetation that enhance its livability. Not only does this greenery make the city more aesthetically pleasing, but it also attracts the sounds of birds and other animals, which help to lessen the loud noises of a busy city. In addition, vegetation provides fresh air and scents that can mask the smell of pollutants commonly found in urban areas. The varied landscape of Sha Tin makes it an attractive area to both city and nature lovers alike, and has a positive impact on the culture and sociability of the city.

Multiple parks scattered throughout Sha Tin also contribute to its attractiveness and serve as areas in which residents can escape the busy city life to socialize with other members of the community. These parks range from flat areas with benches where people can relax in the shade (Figure 18) to small mountains that can be hiked for a view over the city. These parks help to build a sense of community within Sha Tin by providing the residents with public spaces and activities to participate in while there. For example, in Sha Tin Park, there is an odeum that is often filled with people dancing and singing. This odeum, along with the park itself, is strategically placed right next to the main MTR stop in Sha Tin, which brings a multitude of

people through each day. Many of these people, especially tourists, stop at the odeum to watch, and sometimes participate in, the activities happening within it. Not only is the park located right near a major transportation facility, but it is also placed right alongside the main river that runs through the middle of Sha Tin. The view across the water of both the city landscape and the mountainous regions behind it make the park even more preferable to walk around and relax in, bringing in more people, and making the area a hot bed for sociability and cultural blending.

Though Tin Shui Wai Park thrives with greenery and is very aesthetically pleasing, many of its features make it more suitable as a functional walkway than a public space where residents can relax and socialize with other members of the community. For instance, although the park contains many grassy areas with palm trees that create a pleasant tropical environment, they are all contained within raised areas that are one to two feet above walkways (Figure 19). This makes these areas seem less inviting and creates the notion that they are exhibits or displays, rather than places to picnic or rest in. Secondly, other than the specialized locations such as the skateboard ground and the children's playground, the park lacks a central area for activity. It is comprised of mostly walkways and grassy areas, making it difficult to participate in recreation or socialize with a large group without being an inconvenience to those using the park as a shortcut through the city.

A third issue in the design of Tin Shui Wai Park is its disproportional use of land in comparison to the dense surrounding areas. The design of the park lacks variety, which coupled with the lack of activity within the park, leads to a relatively long and monotonous journey for pedestrians. The central plot of land where the park is currently located could be much better utilized. For example, as a way of attracting people to the park for socialization and leisure, a small food marketplace could be established around one of the park entrances, or in one of the

more open areas within. This would encourage people to sit and eat in the park, and would make it a much more attractive place to travel to as either a local or a tourist.

Figure 18
Sha Tin Park showing inviting grassy areas
(Photograph taken by Nathan Ford)

Figure 19
Tin Shui Wai Park showing elevated exhibit-like grassy areas
(Photograph taken by Nathan Ford)

4.4.5 Street-Side Marketplaces

Street-Side marketplaces can benefit any town in a variety of ways. Marketplaces offer the residents of a town a cheaper alternative to chain supermarkets and typically carry a wider range of goods. Marketplaces can also provide residents with a number of employment opportunities, especially self-employment ones. Finally, street-side marketplaces can greatly add to the vibrancy of a town by making bordering streets more interesting and by offering local residents a place to socialize and exchange information.

Tin Shui Wai is marked by a complete lack of street-side marketplaces, as the single planned marketplace was cancelled due to Mightycity Company Limited's concern of competition with its own commercial stores. This clearly has a negative impact on the town in a number of ways. Since there are practically no small stores whatsoever lining the sides of Tin Shui Wai's streets, walkways often become dull and monotonous, and there is little opportunity for any sort of spontaneous exchange or interaction (Figure 21). A lack of marketplaces also means that there is little competition for the supermarkets in the area, the majority of which are owned by a single retail entity. In fact, a survey taken of the residents in 2009 found that residents often traveled outside of the town for their shopping needs, complaining that the local supermarkets were overpriced or did not have a wide enough variety of goods. Finally, given the relatively low average income of the local residents, a marketplace would clearly be more suitable than the Kingswood Ginza, the current shopping center of the town which carries mostly expensive luxury items. A marketplace would not only provide residents with products more coherent with their social and economic standings but could also provide a number of much needed employment opportunities.

Sha Tin on the other hand contains several marketplaces, as well as great numbers of smaller street-side stores in most locations. These stores create a much more vibrant and pleasant atmosphere that not only makes walking more interesting and attractive, but also provides residents with much greater freedom of choice in their daily routines (Figure 20). In this aspect, Sha Tin's urban design of including small stores and marketplaces offers clear benefits compared to Tin Shui Wai's modular, self-contained design.

Figure 20
Sha Tin – Outdoor marketplace near Sha Kok Street
(Photograph taken by Nathan Ford)

Figure 21
Tin Shui Wai – Small shopping center near Tin Yui Roa
(Photograph taken by Nathan Ford)

4.5 Recommendations

4.5.1 Parks Should be Designed for Activities

If a park is not designed to accommodate a variety of people, the result is a public space that is seldom used by the public. Though parks must be designed as functions of travel, they must also be attractive to the pedestrians that would prefer to participate in recreation and leisure. A park needs a suitable space to accommodate a wide range of activities. One way to integrate the park as both a function of travel and recreation is to place the walkways within it on the same plain as the grassy areas that surround them. This will result in an area that is easy to walk through, as well as a place that invites the park-goers to either rest or to engage in recreational activities. The locations of a park's activity areas are also an important feature to consider when designing a public space. For example, the odeum in Sha Tin Park is strategically located to be the focal point of the park, and due to this, a wide range of people are attracted to watch and participate in the activities that occur there. Many of the activity areas in the Tin Shui Wai Park are hidden on the outskirts of the park, and, as a result, they are seldom used or visited. It is recommended that these activity areas be placed in locations that are visited by a large number of people.

4.5.2 Create More Diverse Retail Facilities

Retail facilities in a town must be designed to provide both for the economic and the social needs of a community. A wide range of facilities should be available, from shopping centers to markets and street-side shops, to provide residents with a selection of lifestyles. Shopping centers and markets should offer a variety of product choices that cater to the needs of residents of all classes and income levels. Commercial facilities should also be located in a way that promotes interchange between residents and fosters community growth. By

keeping these recommendations in mind, retail centers can improve a city by enhancing the local community and vibrancy, as well as by providing residents with functional, economic shopping choices.

4.5.3 Make MTR Station Central to the Community

The MTR is integral to Hong Kong society and even more so to residents of new towns who heavily depend on the MTR to travel to work. As such, MTR stations should be strategically positioned in the central hub of all new towns allowing all residents equal accessibility to travel to and from the central hub of their town. A central hub is made complete with shopping centers and markets. This would make other modes of transportation that take away from the joy of walking like a light rail system would become unnecessary. A town built around an MTR station forces people to walk to the hub of their town if they want to travel through Hong Kong. The stations central location also provides the ideal gateway for tourists upon arrival to one of the new towns. In short the MTR system is the backbone of Hong Kong and this trend should continue in the new towns.

4.5.4 Balance Arterial and Local Roads

The pedestrian transport system of Tin Shui Wai suffers greatly from its lack of local streets, its abundance of large arterial roads, and its gated off private housing communities. When designing the street layout of a city, multiple factors must be considered. First, there must be a good mix of smaller local roads and larger arterial roads so that travel throughout the city is not a burden. The main issue with having too many large streets in a city is that crossing them can be troublesome, especially if that road is constantly flooded with high speed cars. The inclusion of smaller local streets in a street layout design allows the pedestrian to have more route options in which they can avoid these larger streets if desired. Another aspect of a city that

can severely hinder pedestrian travel is gated communities. Although gated housing estates can provide safety for the residents living in them, they also divert the flow of pedestrian traffic on the outside of the estate, and can make travelling through the city much more difficult. If those gates were not present, many more route options between destinations would become available, and the possibility of social interactions between members of different communities would increase.

4.5.5 Retain the Natural Environment and Culture

As stated in the urban design guidelines of new towns, the surrounding environment should inform the design of the new towns. Urban planning professor Mee Kam Ng would take this guideline a step further by saying that the native culture of the area should also be maintained. Creating a town with these guidelines in mind would make each town distinct with its own architectural aesthetics and cultured community. The surrounding areas of new towns, which are likely to be farmland, could be integrated into the culture of the new town and share applicable resources. Sha Tin has embraced these guidelines to an extent by seamlessly blending the nature around it and using the Shing Mun River as the town's focal point. On the other end of the spectrum Tin Shui Wai was developed with land constraints and on top of a natural fishpond area. The creation of Tin Shui Wai was as environmentally destructive as it was expensive.

5 CONCLUSION

5.1 Summary of Findings

Through background research, fieldwork, and analysis we have concluded that there are many negative aspects of Tin Shui Wai's urban design that hinder community development within the town. Though designed rather well from a theoretical standpoint, Tin Shui Wai falls short of providing the necessary accommodations, like vibrant active streets, to allow a strong community to develop. Sha Tin, while not perfect, does a much better job. Our analysis indicates that several failures during the planning of Tin Shui Wai started the town off on the wrong foot, including the aggressive housing policies that caused nearly all of the northern reserves zone to be constructed quickly with public rental housing and the allowing of private developers to monopolize the commerce in the area. These same private developers blocked attempts to create places such as markets that could have helped foster social interactions (Law et al, 2009). The role of vibrant and active streets acting as a continuous grid of public space for social interactions cannot be overstated. We hope the recommendations we provided will help future urban designers avoid some of the pitfalls of Tin Shui Wai while maintaining its good aspects and the good aspects of Sha Tin.

5.2 Suggestions for Future Research

Though our project identified aspects of urban design that contribute to community development and how Tin Shui Wai (and even Sha Tin to an extent) failed to implement them, it does not provide comprehensive suggestions on how exactly to implement things such as vibrant, walkable streets in a way that accommodates all residents of the town. As discussed in the background, although residents of Tin Shui Wai do not think their shopping centers represent their economy and spending patterns, some were not too fond of making room for street

hawkers. Creating a balance between busy, lively streets while also maintaining the degree of peace and quiet that residents expect to find in towns rather than cities is quite a challenge. Future researchers might look into how designers can create streets in new towns with the vibrancy and sociability of those in Mong Kok and around Temple Street in Yau Ma Tei without producing the equivalent amount of noise that residents expect to avoid by living away from urban areas. Additionally, one might look into how a town might be designed to compensate for the lack of natural scenery in an area like Tin Shui Wai, as future towns will inevitably need to be constructed in areas without the luxury of the pristine natural scenery found in Sha Tin. While this report has identified successes and deficiencies in urban design of towns, additional research is needed to develop ideas and plans to implement the suggested recommendations in a way that balances the needs of the government, future residents, and developers altogether in a fair and constructive way.

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APPENDIX A: ABOUT OUR SPONSOR

This appendix lists information about our sponsor, the Chinese University of Hong Kong. The following excerpts have been copied from the university's website at the time of submission and can be retrieved from http://www.cuhk.edu.hk/english/aboutus/message.html.

Director's Message: (Educate. Interact. Evolve)

The development of architectural education has witnessed dramatic changes in the last two decades for reasons within and beyond the discipline. Urbanization and architectural development in the region poses both challenges and opportunities for future research and teaching in all areas of physical design and considerations to sustainability. In anticipation of the evolving times, the School of Architecture has committed itself to formulating and refining its mission and role to education, society, and the profession. It is in this light that we undertook to offer several new programmes in the design disciplines, to increase the scope and depth of faculty research, and to drive the planning and design of the new multi-functional building of the School we now proudly call home.

Located at the epicentre of the fastest urbanization process in the world, the School consistently addresses issues in urban planning and architectural design both in research and in practice. The pedagogical approach adopted at the School advances knowledge in both local and international contexts while serving the profession and the community. Curriculum design for both our undergraduate and graduate programmes sees knowledge in sustainable architecture permeating different courses. Specific studios facilitate and drive knowledge application within a professional environment. An ideal architectural education is about creating a favorable environment for the acquisition, synthesis, and negotiation of various design parameters; it is about applying universal principles in local contexts. The School of Architecture is set to nurturing and supporting our students' education objectives and development in this exciting time of evolution.

I welcome all to surf the pages and peer into the education opportunities we offered, academic and professional activities we organized, research fields we engaged in, and above all, looking into the exciting new building that we occupied in 2012. Open, lively and bright, our new home base aims to support and enable creativity and design studio activities primed on interaction, lively debates, and generating positive energy. Enjoy.

Puay-peng Ho
Director and Professor
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About Chinese University of Hong Kong

Message from the Vice Chancellor and President

Founded in 1963, we are a university that is as firmly rooted in Chinese culture as it is positioned in modern civilized society. After half a century of growth and development, we have become a comprehensive research university, a regional leader with a global reputation.

Since the inception, we have committed ourselves not only to advancing academic research but also upholding the humanistic culture. A university's role is not only to impart knowledge, but also to groom the moral character of our society's future torchbearers. This, we believe, is the essence of a university and the *raison d'être* of the Chinese University.

Joseph J.Y. Sung
Vice-Chancellor and President

CUHK Mission

To assist in the preservation, creation, application and dissemination of knowledge by teaching, research and public service in a comprehensive range of disciplines, thereby serving the needs and enhancing the well-being of the citizens of Hong Kong, China as a whole, and the wider world community.

CUHK Vision

To be acknowledged locally, nationally and internationally as a first-class comprehensive research university whose bilingual and multicultural dimensions of student education, scholarly output and contribution to the community consistently meet standards of excellence.

CUHK Motto

The motto of the University is '博文約禮' or 'Through learning and temperance to virtue'.

These words of Confucius have long been considered a principal precept of his teaching. It is recorded in the *Analects* of Confucius that the Master says, 'The superior man, extensively studying all learning, and keeping himself under the restraint of the rules of propriety, may thus likewise not overstep what is right.' (Legge's version of the *Four Books*)

In choosing '博文約禮' as its motto, the University is laying equal emphasis on the intellectual and moral aspects of education.

APPENDIX B: INTERVIEW QUESTIONS AND TRANSCRIPTS

Interview Questions for Professor Mee Kam Ng

1. Considering the urban planning of Sha Tin, in your opinion, what are its strengths and shortcomings?
2. Considering the urban planning of Tin Shui Wai, in your opinion, what are its strengths and shortcomings?
3. In terms of community planning, how can Tin Shui Wai be improved?
4. What urban planning decisions do you think have negatively affected the community of Tin Shui Wai?
5. For New Towns in general, what are some urban planning guidelines you would reccomend to ensure a strong community?
6. Do you think there are any major deficiencies in the urban planning department of Hong Kong?
7. Do you think income diversity plays an important role in developing a strong community?
8. What do you believe are the most important aspects of a community within Hong Kong?

Interview Questions for Professor Hendrik Tieben

1. Considering the urban design of Sha Tin, in your opinion, what are its strengths and shortcomings?
2. Considering the urban design of Tin Shui Wai, in your opinion, what are its strengths and shortcomings?
3. What do you believe to be the main reason for the failure of Tin Shui Wai?
4. How do you think either Tin Shui Wai or Sha Tin could be improved from a design standpoint?
    a. Mixed-use buildings
    b. Smaller, local streets
    c. Street Side marketplaces
    d. Pedestrian walkways (overpasses and subways)
    e. Natural scenery
    f. Density of and diversity of buildings
    g. Gated off areas
    h. Size of housing estates (less blocks more estates or more blocks less estates)
5. Hypothetical Questions: If you switch the people in Sha Tin and Tin Shui Wai what do you think would happen?

Transcript of Interview with Professor Mee Kam Ng

Considering the urban planning of Sha Tin, in your opinion, what are its strengths and shortcomings?

After riots in 1966 and 1967 the government realized that the people were not happy. A stable place to stay is very important for Chinese people, so government decided to launch a ten-year housing strategy. This strategy gave a push for new town development. Sha Tin was one of new towns developed to accommodate ten-year housing program. Sha Tin was very successful because it came with the mass transit. This was also a time when they had very little concern about land constraints when developing new towns. This is why Sha Tin is much more spacious, and everything is more generous. At the time of the development of Sha Tin, they had what was called the New Territories Development Office, which was a multidisciplinary team consisting of planners, engineers, designers, etc. Everyone came together under one office to work out how the town should be developed. That institutional setup was a very clever way of developing the new area so you could always have a group of people looking at the issues from a different perspective and monitoring the implementation of the town.

Have there been any shortcomings that you've seen?

Sha Tin used to be a place to go have picnics and was considered very remote. Could have done better in conserving its heritage.

Considering the urban planning of Tin Shui Wai, in your opinion, what are its strengths and shortcomings?

One of Tin Shui Wai's main issues is that it is located very far from urban area. It's not an area that the government had planned to build a new town. At the time it was built there was no mass transit linkage. It was very expensive and environmentally destructive to build this new town. They needed to drain the ground and fill in the fishponds in the area just to build the new town. This entire process is very expensive. Another issue is that there is an imbalance between public and private housing. They only have one developer monopolizing on private housing market. The developer also made a secret deal with the government. The government had to agree not to develop any commercial activities in Tin Shui Wai. This is why Tin Shui Wai has no local economy. With no economic opportunities due to few employment opportunities and no mass transit, the people of Tin Shui Wai we're placed in a difficult position. When the SAR was set up in 1997 – They had a policy of building 85000 units a year. Stock crash in 1998 – Housing policy could not continue. Due to crash – all public housing became rental housing rather than ownership housing. On top of this, you have one developer monopolizing on private housing. Because pedestrian networks are all elevated, there is not much activity at street level.

In terms of community planning, how can Tin Shui Wai be improved?

Tin Shui Wai is in a rural area farm area. People tried to develop their own market close to the river. That piece of land was not meant to be only for recreation purposes and so the market was constantly being interrupted and shut down. It is unfortunate because they actually did have a very vibrant morning market. After being shut down, the government gave the people another piece of land to set up a marketplace, but it was not successful because it was a poor location. If the people were allotted more resources and they come together and underwent a more systematic community planning process to work out a possible strategy to improve the city, then they could turn themselves around. Hong Kong has no community planning. The planning system is generally top down and there are very little resources allotted toward planning for the community. There is potential given that there are social workers there that are enthusiastic trying to make Tin Shui Wai into a better place.

What urban planning decisions do you think have negatively affected the community of Tin Shui Wai?

The problem with the planning system in Hong Kong is that the urban planners make the plan and they are not involved in implementation. Tin Shui Wai didn't have the same mechanism of an interdisciplinary office to plan the city like Sha Tin did when it was being developed. The planners did not have much leeway choice when developing Tin Shui Wai.

For New Towns in general, what are some urban planning guidelines you would recommend to ensure a strong community?

First and foremost, the planners of the future new towns should not be using the mentalities of the planners of the 20th century. In the 20th century, the developers built the new towns and paid no attention to the environment, the natural landscapes, and the indigenous people. The indigenous people have their own way of living, whether it's farming, fishing, etc. and generally they were forced out of their homes when the new towns were built. Respecting nature and respecting culture are very important. They need to do a lot more research of the area that a new town would be built including the effects that its development would have on the environment, and the people that are already living there.

Do you think there are any major deficiencies in the urban planning department of Hong Kong?

The planning department is a weak department in the government. They only plan and they have no power to implement. Even in the planning stages, a lot of the development parameters are already predetermined by the buildings ordinance, which is set by the building department. Related to the building ordinance there are building regulations that set the guidelines for spatial development. In theory, urban planners should be able to go to the site area and study the community, environment, and everything else about it so that they may develop

something that is unique to that specific area. Unfortunately, planners in Hong Kong don't have much flexibility at all because they need to work within development framework set by others.

Do you think income diversity plays an important role in developing a strong community?

A high level of poverty or unemployment can have a large impact on a community. One issue though is that many people of Hong Kong need to rely on the government to take action for them rather than doing things for themselves. If the government, or a large enterprise did assist in providing jobs for people though, it would help the community as a whole. When someone becomes employed, they begin working with other people. This sense of community with a group of other people working in the same field on similar tasks can make a person happier. They then bring that happiness back home, and it will build into a more positive cycle.

What do you believe are the most important aspects of a community within Hong Kong?

Community and individuality are not big for Chinese culture. Family and nationality are both more important. People need to realize that they can do things for themselves. They generally think that change can only be made by the government or by social workers. Everyone is unhappy because the private sector is making a lot of money and the government is skewed towards the interests of the developers. People of Hong Kong understand the limitation of housing there, but they are frustrated when they look around and see what other people have.The main priorities of an average Hong Kong citizen are family, jobs, income, housing, and making ends meet.

Transcript of Interview with Hendrik Tieben

Considering the urban design of Sha Tin, in your opinion, what are its strengths and shortcomings?

According to Hendrik, Sha Tin benefits greatly from its well-planned layout and development. By using the riverfront as the centerpiece of the town, urban planners were able to create well-defined and clear relationships between transportation, open spaces, and the distinct town center. These distinct relationships create a very walkable and well-connected city with a high quality of public spaces, and make it easy for local residents to take part in urban life. Furthermore, by using the MTR as the driving force behind development, Sha Tin has been able to establish excellent connectivity to nearby urban hubs very on in its development, which provided residents with employment opportunities and also attracted private investors to the area.

Considering the urban design of Tin Shui Wai, in your opinion, what are its strengths and shortcomings?

Tin Shui Wai suffers from a number of poor urban design decisions that negatively impact the local community. Due to the modular design of the Tin Shui Wai estates, neighborhoods tend to be very inwards looking, isolating residents and reducing interaction between groups. Additionally, the streets are not designed as connectors making them unsuitable for use as public spaces, in contrast to other towns that incorporate much more open streets where community life can develop. Combined with the poorly designed light rail system using sectioned off rails, the entire city becomes fragmented and there is an overall lack of a holistic idea to link together the nearly 300,000 residents of the city.

What do you believe to be the main reason for the failure of Tin Shui Wai?

Hendrik's opinion on Tin Shui Wai was that the town provided a much greater challenge to design and was also hindered by a number complications during the early stages of its development. Because of these reasons, it may not be fair to directly compare the two towns, and its lack of success cannot be blamed solely on poor planning decisions. Due to Tin Shui Wai's remote location, it was difficult to attract private sector interest in the area, which in turn made it difficult to create employment opportunities. This made the area less attractive to middle and upper class citizens, hurting the local economy and skewing the community mix towards lower income residents. However, Hendrik did point out that Tin Shui Wai's remote location is not the only contributing factor to its lack of success, as Yuen Long is located in the same remote area but has been far more successful.

How do you think either Tin Shui Wai or Sha Tin could be improved from a design standpoint?

While Sha Tin is already a very successful new town, it can still benefit from a number of improvements. A few of the suggestions that Hendrik gave included fuller utilization of the river by creating attractions such as activities on the water, or waterfront restaurants. The current bike paths within Sha Tin are also fairly limited to the waterfront, and don't branch out very much into the city, resulting in biking being used mainly for leisure and not for transportation. Finally, better connectivity with attractions located in the nearby mountains could also benefit residents, as currently many shrines and leisure spaces in that area are difficult to access.

Hendrik also suggested a number of improvements that could be made to Tin Shui Wai to make it a more attractive place to live. These changes include making the city more walkable by setting up the LTR as a tram, with rails that can easily be crossed by pedestrians, and by turning the large arterial roads into public spaces by making them easier to cross. A number of facilities such as the empty car parks could be repurposed to create places that can be adapted by residents to take ownership of the city, and small scale retail or night markets could be added in strategic locations to promote community life.

Hypothetical Questions: If you switch the people in Sha Tin and Tin Shui Wai what do you think would happen?

Switching the residents in both towns may help to fix some issues such as the imbalance between various classes. In the case of Tin Shui Wai, a large influx of low income people very early on in the development created bad economic conditions and hindered the attractiveness of the area for the rest of the development. The lack of MTR transit to Tin Shui Wai early on in its development also detracted from the area, negatively affecting the community mix and discouraging private sector interest in the area. Sha Tin is located in a very strategic location and contains much more employment opportunities than Tin Shui Wai, which could certainly help out the residents of Tin Shui Wai if the locations were switched.

APPENDIX C: CENSUS AND DEMOGRAPHIC DATA

The following tables were created from census data obtain from Centamap.com. The Centamap website compiles census data from the Hong Kong Government's Cenus and Statistics Department and Survey and Mapping Office.

Table 3
Resident Population of Study Areas in Each Town

Tin Shui Wai	Sha Tin (Study Area)
264,956	131,506

Table 4
Population Density of Study Areas in Each Town

Tin Shui Wai	Sha Tin (Study Area)
883.19 persons/hecatre	571.77 persons/hecatre

Table 5
Number of Housing Units of Each Type in the Study Area of Each Town

Type of Unit	Tin Shui Wai	Sha Tin (Study Area)
Public Rental	55213	20507
Subsidized Sales Flats	19190	4007
Private Permanent Flats	20157	22778

Table 6
Percent of Residents that Work in the Same District they reside in

Tin Shui Wai	Sha Tin (Study Area)
26.79	29.24

Table 7
Residents' Method of Commuting to Work in the Study Area of Each Town

Mode of Transportation	Tin Shui Wai	Sha Tin (Study Area)
MTR	41.43%	34.30%
Buses	41.00%	38.38%
On Foot	5.69%	9.38%
Public Light Bus (PLB)	1.16%	3.17%
Other	11.00%	13.98%

Table 8
Average Montly Houshold Income by Type of Residence

Housing Type	Tin Shui Wai	Sha Tin (Study Area)
Public	HK $15,574.3	HK $13,896.1
Private	HK $27,568.1	HK $33,467.3

APPENDIX D: MAPS

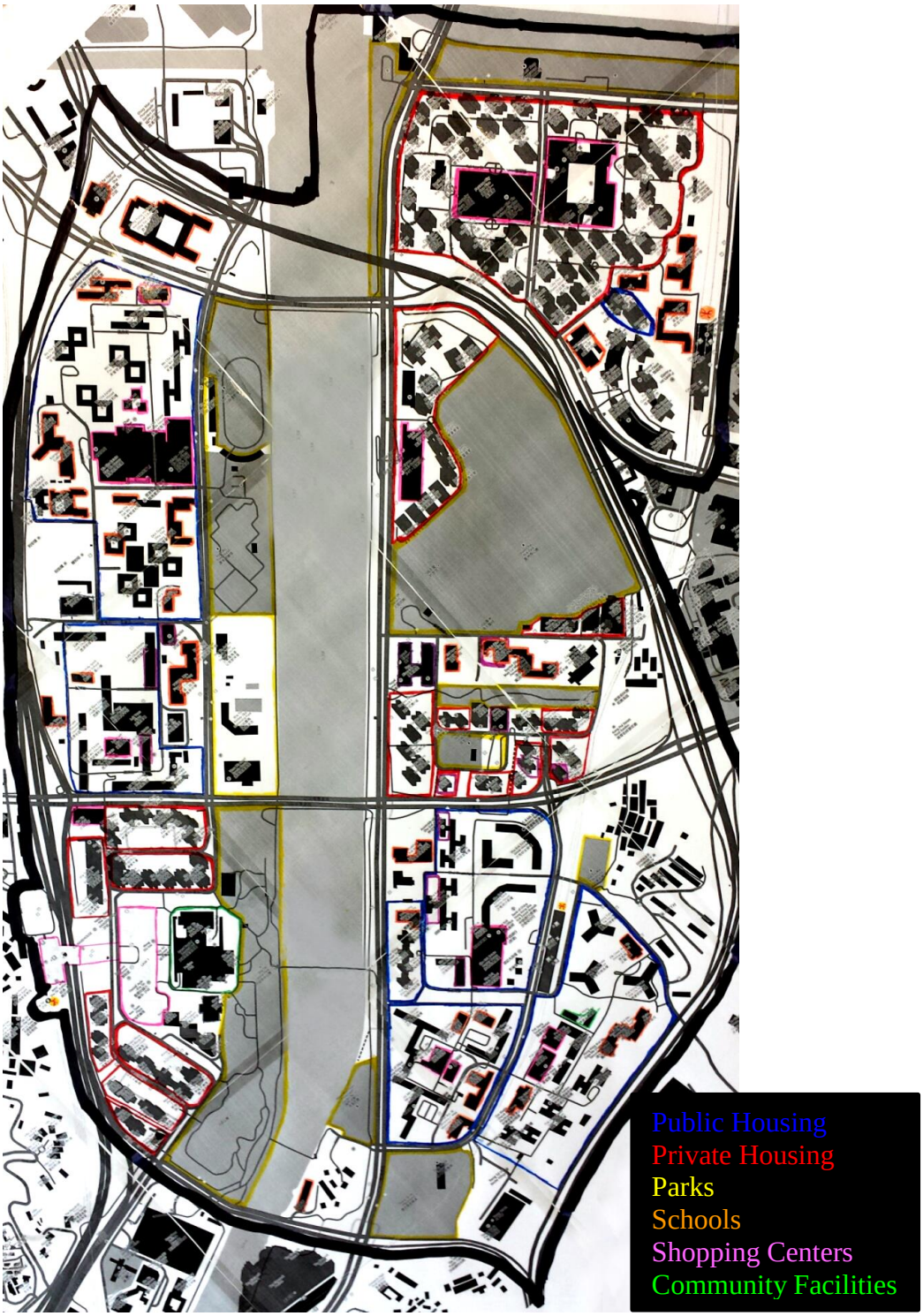

Figure 22
Building and Area Usage in Sha Tin (Original Drawing)

Figure 23
Building and Area Usage in Tin Shui Wai (Original Drawing)

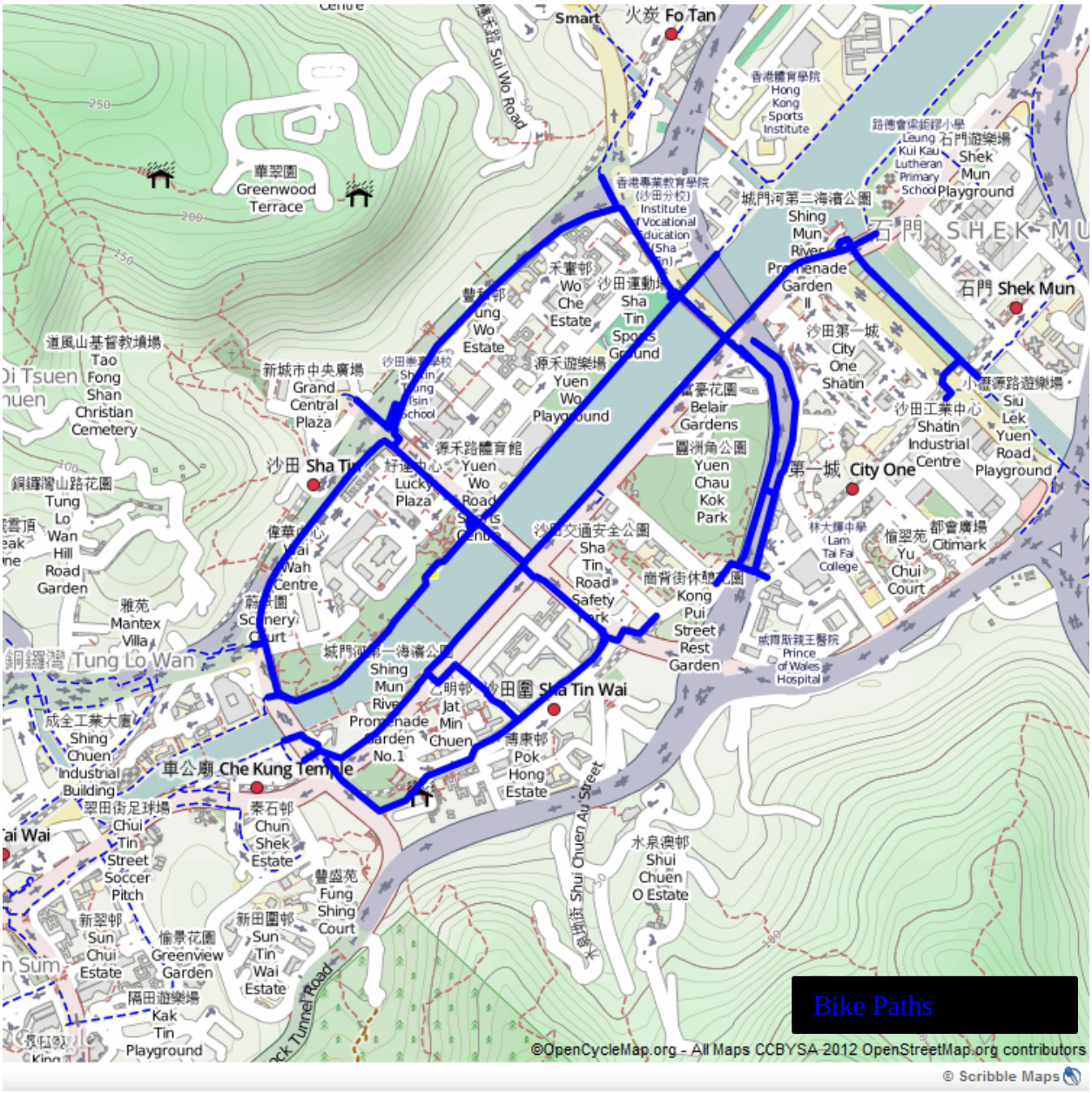

Figure 24
Map of Bike Paths in Sha Tin

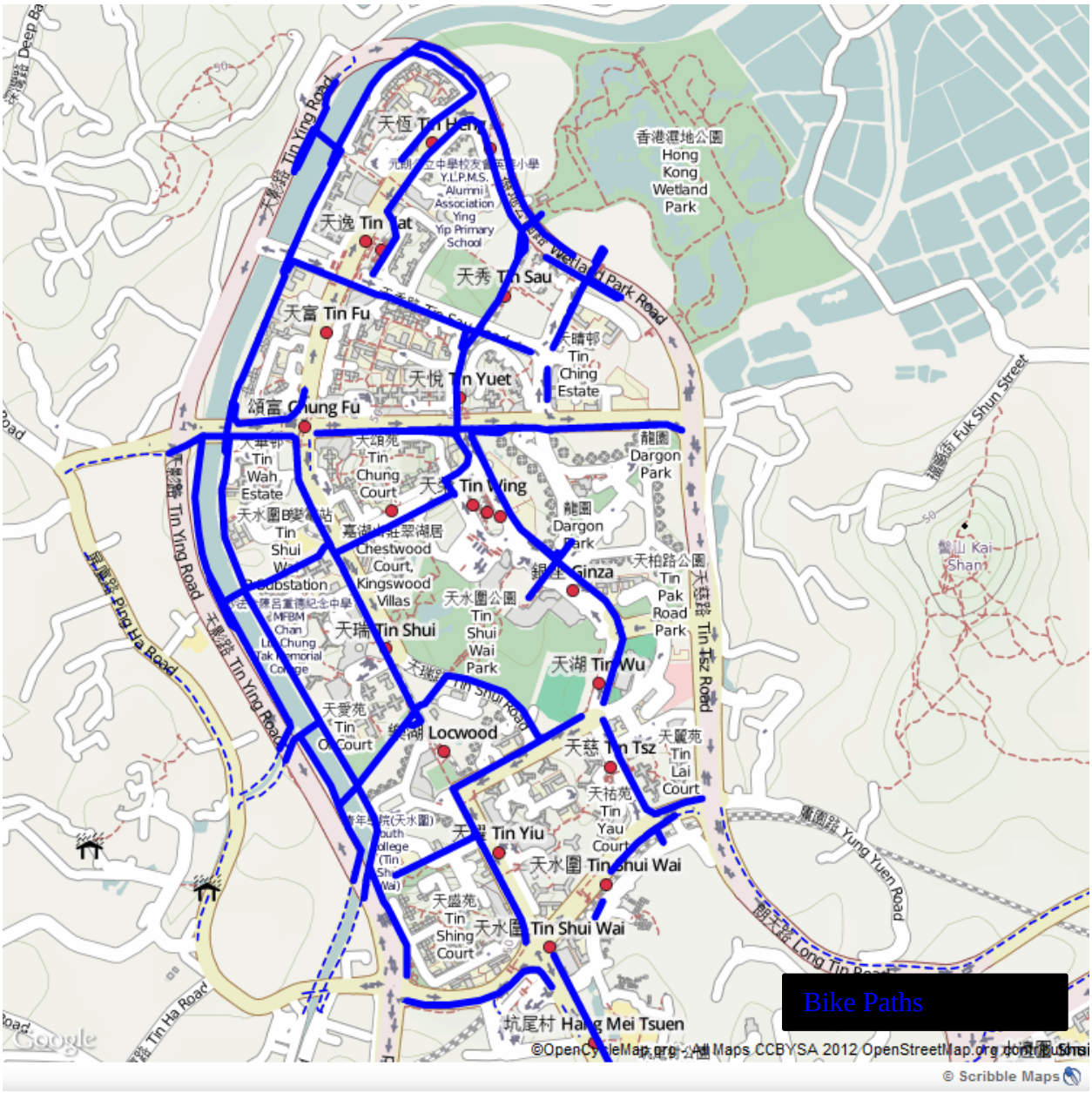

Figure 25
Map of Bike Paths in Tin Shui Wai

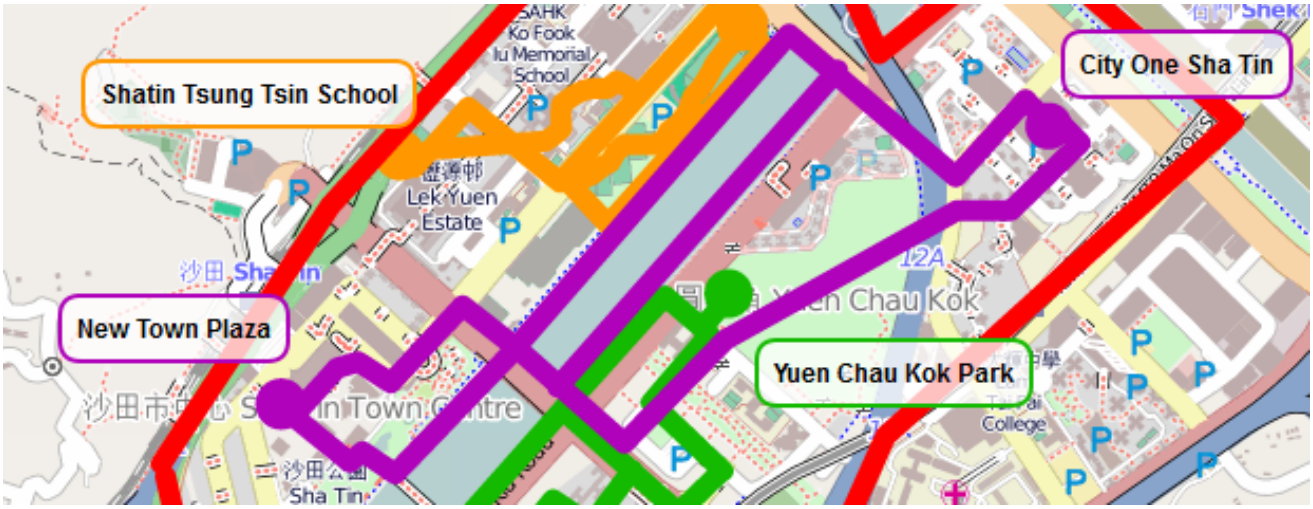

Figure 26
Close Up of Walking Route between City One Sha Tin and New Town Plaza in Sha Tin

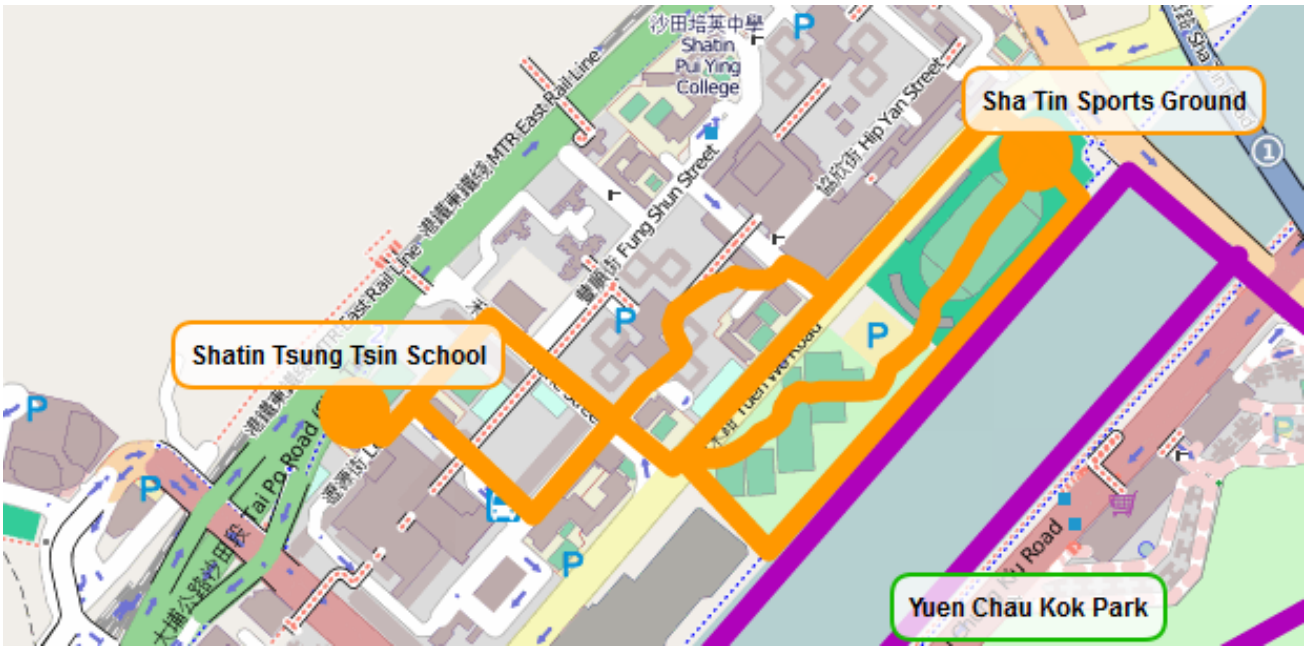

Figure 27
Close Up of Walking Route between Shatin Tsung Tsin School and Sha Tin Sports Ground in Sha Tin

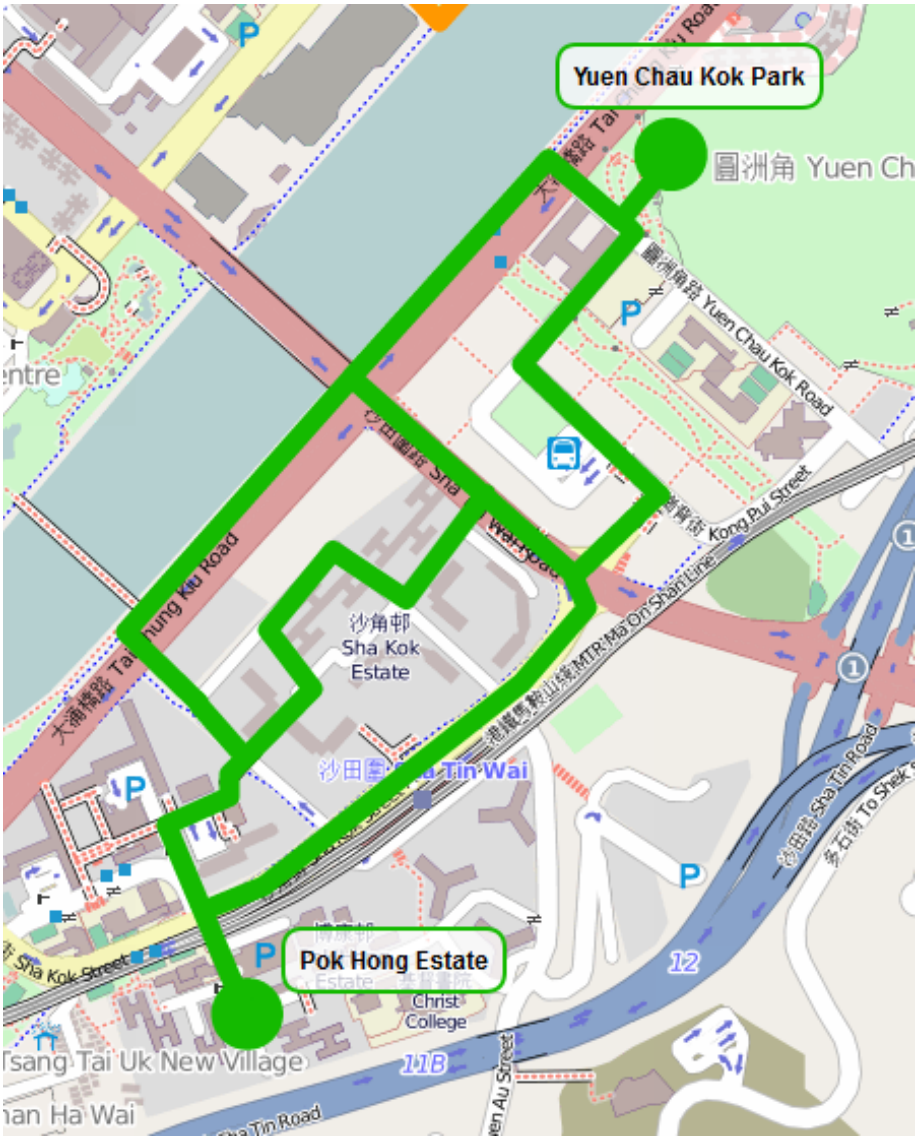

Figure 28
Close Up of Walking Route between Pok Hong Estate and Yuen Chau Kok Park in Sha Tin

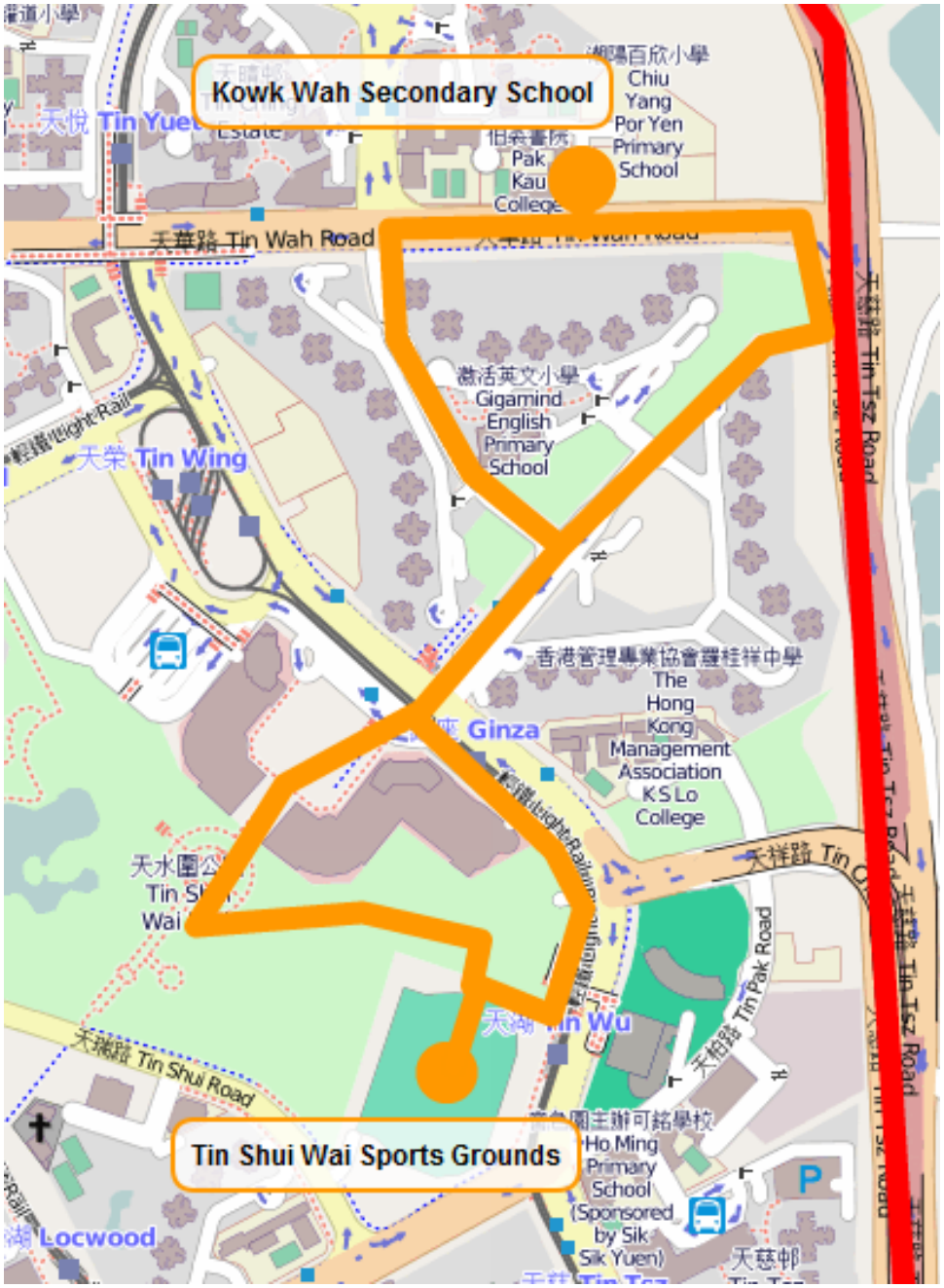

Figure 29
Close Up of Walking Route between Kwok Wah Secondary School and Tin Shui Wai Sports Grounds in Tin Shui Wai

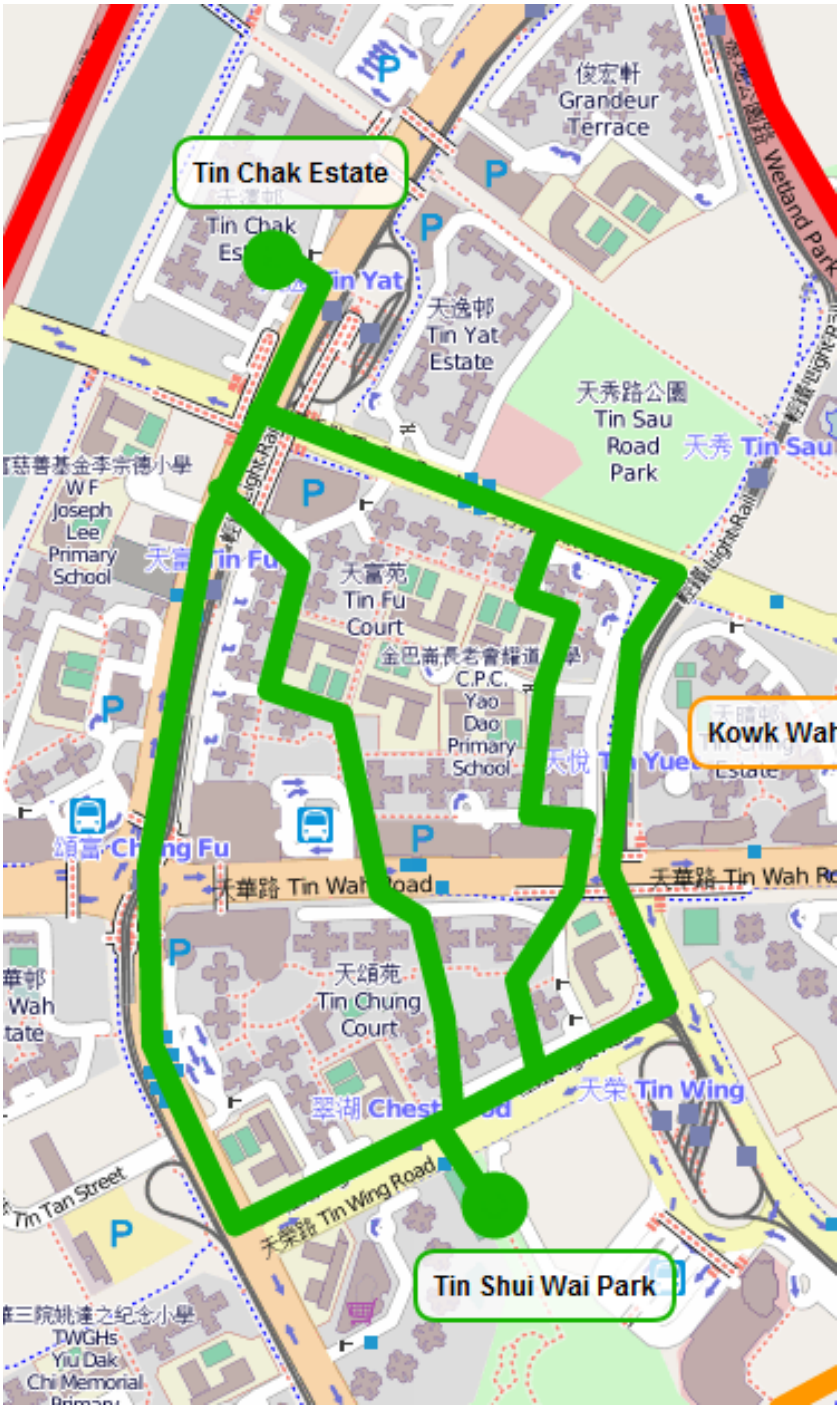

Figure 30
Close Up of Walking Route between Tin Chak Estate and Tin Shui Wai Park in Tin Shui Wai

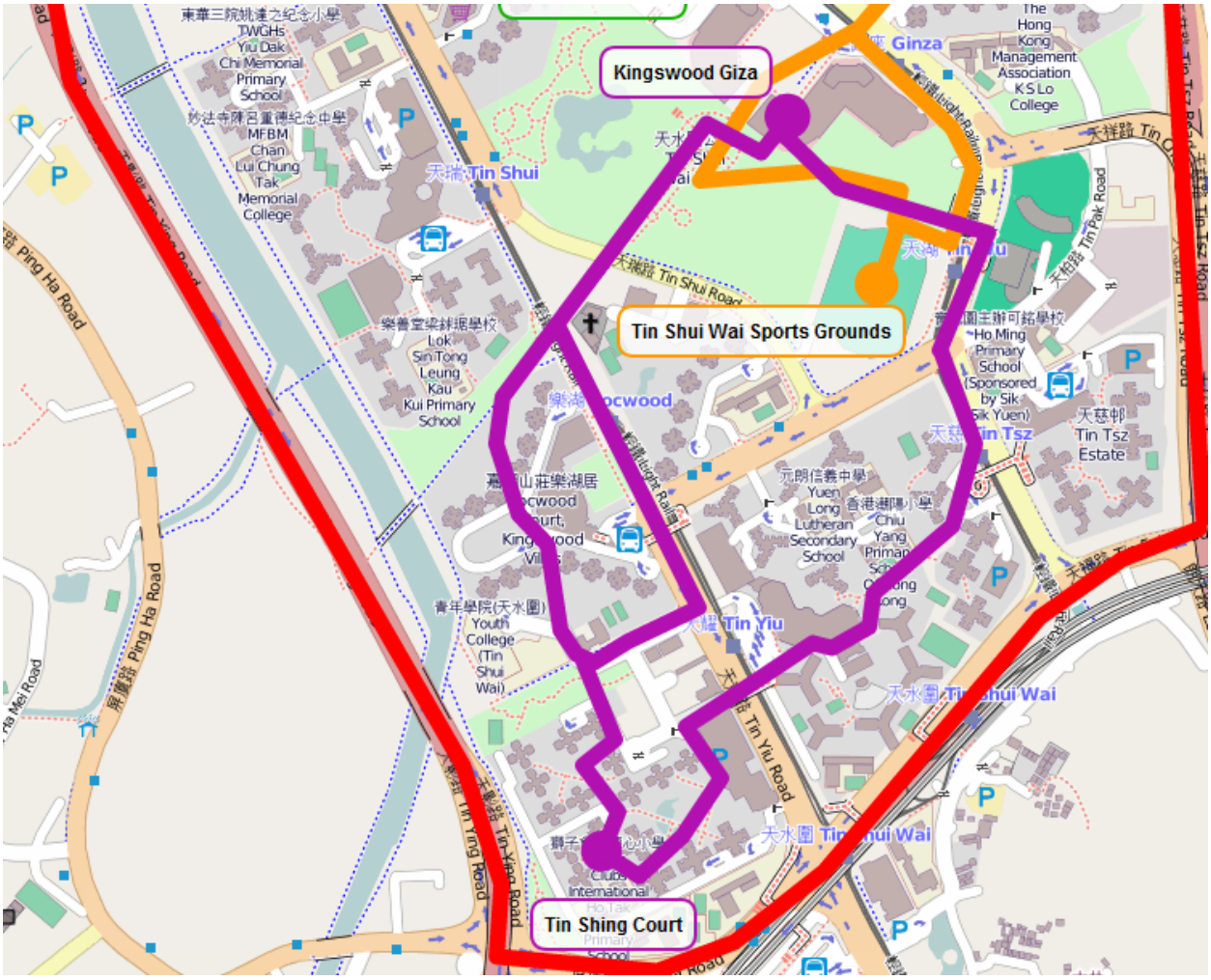

Figure 31
Close Up of Walking Route between Tin Shing Court and Kingswood Giza in Tin Sui Wai

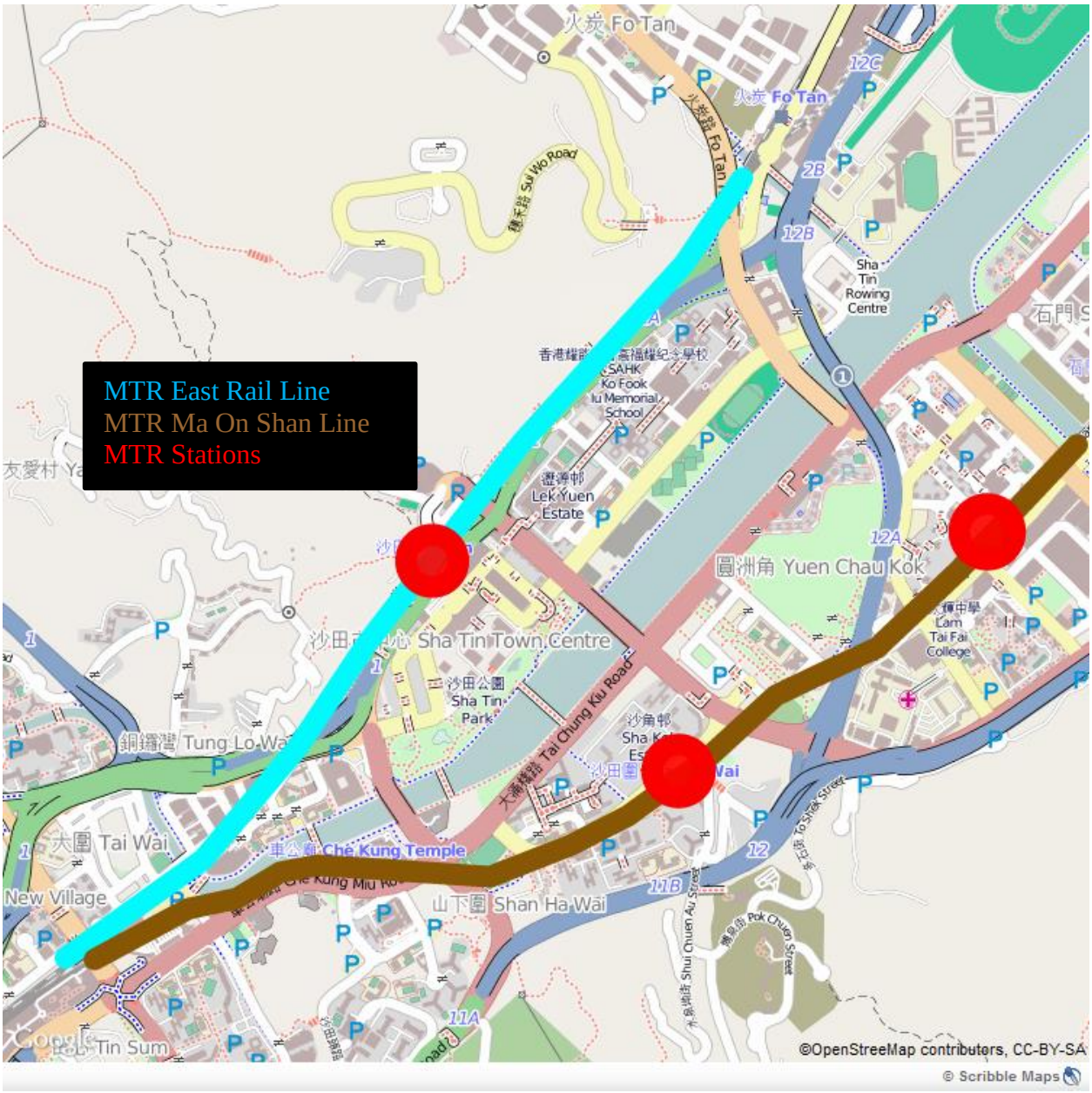

Figure 32
Map of MTR System in Sha Tin

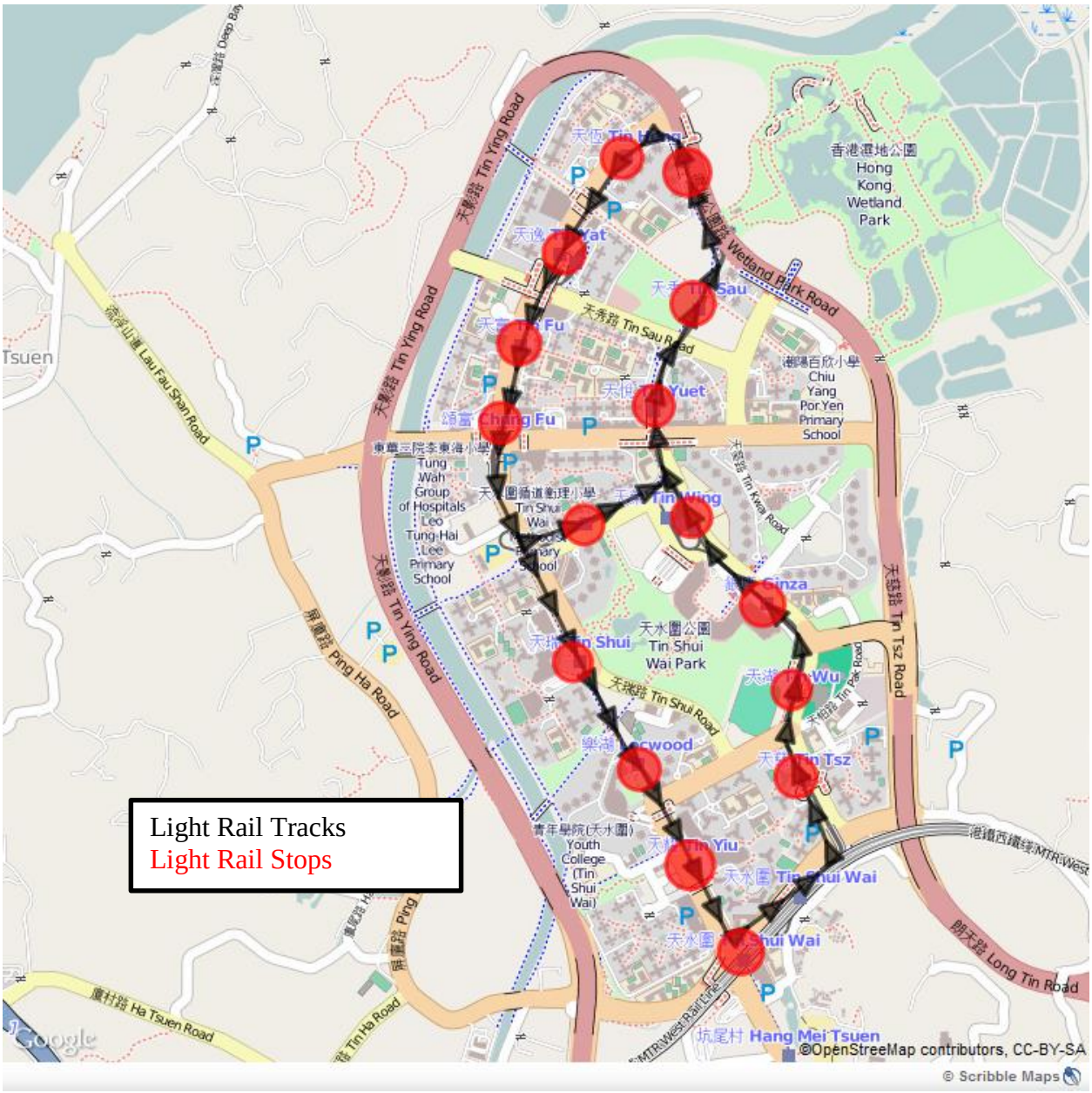

Figure 33
Map of Light Rail System in Tin Shui Wai